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LIBRARIES

*A Vision for the 90's
and Beyond*

PROCEEDINGS OF THE
34TH ANNUAL
MILITARY LIBRARIANS
WORKSHOP

EDWIN B. BURGESS, EDITOR

October 9-12, 1990

U.S. Army Training and Doctrine Command
Library and Information Network (TRALINET) Center
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VISIONS FOR THE NINETIES

Librarians, particularly Federal librarians, face a multitude of challenges in the next decade. This may not come as a surprise to many librarians. Speakers at this year's Military Librarians' Workshop found a number of problems to worry about, but fortunately found a lot of ways to make things better, too.

Probably the most intractable information problem of the Twentieth Century is that there is just too much of the stuff to control. Books keep coming in, hyperactive fabulists keep pounding out fiction, scientists discover new minutiae which require thousands of closely written articles in hundreds of new periodicals. And about once a week someone comes in to the reference department and asks for everything ever written on World War II.

For some years this was a problem, but a problem we felt might be controlled by adequate subject indexing of books, maybe some analytics, and perhaps an occasional new periodical index specializing in whatever branch of study might be hot. But by the end of World War II that was clearly not a winning strategy. The sheer mass of learning was increasing at a rapid rate, and worse, the rate of increase was also increasing steeply.

At least one man saw a possible solution. "As We May Think," Vannevar Bush's seminal article in Atlantic Monthly, July 1945, remained an interesting piece of science fiction for forty years. Bush's "memex" was a desk which contained a large microfilm storage/retrieval device and another device which allowed the owner to create associative trails through the masses of books thus preserved. In 1986 Microsoft Press rediscovered the essay and made it the centerpiece of a collection which purported to show that CD-ROM was the technology Bush had foreseen. It would sweep the world, distributing vast files of data to every level of society.

CD-ROM, however, did not fully meet its early promise. One reason was that there seems to be a limit above which the mind cannot easily encompass a great volume of data; 650 megabytes of raw data, the approximate capacity of a CD-ROM disk, is probably well above that limit. Another reason had to do with the inadequacy of retrieval engines available for microcomputers. A number of commercial products were issued which failed to adequately address the difficulty of sorting out what one actually wants from what the publishers have offered.

Application of artificial intelligence techniques to the great masses of data now becoming available in machine-readable form at the desk level seemed like a reasonable technological advance. However, the forbidding reputation of artificial intelligence and the distressingly technical language often used by its devotees can daunt potential users. Concepts like "metarules," "knowledge engineering," "symbolic processing," and "formalism" do not promise easy access.

Solutions, naturally, appeared quickly. "Knowledge engineers" people who can translate the subject knowledge of an expert into rule-based logic, would identify several capabilities which a working retrieval system must have:

the ability to link diverse passages to one another heuristically, identifying relationships that are not readily apparent

the ability to adapt the search process to the searcher's line of inquiry

a variety of display formats, including images of original documents

the capability of being customized as it's being used

--Ralph Alberico and Mary Micco, Expert Systems for Reference and Information Retrieval, Meckler, 1990.

One very promising system which does something very like those functions is described by Lewand and Bielawski here. Interestingly, it does not subvert the librarian's traditional role; rather, the answer to handling great masses of information is to classify, sort, combine, label, separate, and (dare one say?) catalog it in great detail before handing it to the user. That this is a large part of the answer should come as no surprise to librarians.

The tools for the task of handling large amounts of data dispersed widely among end users are likely to be quite different from those we have used in the past. Straightforward Boolean searching of a massive text file, for instance, is likely to be inadequate, since it fails to provide a meaningful browse capability and requires a thorough knowledge of the proper terminology. Instead, REGIS and the other similar products described by Lewand and Bielawski are presented to the user with critical links already forged between related pieces of information, but are so flexible and complex that the user can take control and travel freely throughout the haystack. Something like the memex is in operation.

Other products described by contributors from DTIC and NLM take somewhat the same tack while doing dissimilar tasks. There are rules which allow us to predict how users will use information, and to smooth their way as they abstract bits, make connections, or even create new information. Thorough understanding of the process of information retrieval has allowed the system designers to provide heuristic solutions for unpredictable situations.

Artificial intelligence, then, is not an abstract and unattainable concept. In this context, artificial intelligence may be thought of as just very thorough, very well thought out programming. It ceases to be impractical or visionary and begins to be an operational tool which can make a huge difference in information retrieval.

It is clear from the readings in this volume that Federal (or any other) information science professionals have a long way to go before their libraries can be integrated with search aids based on artificial intelligence programs in any comprehensive way. It is also clear that specific products, limited to rather specific knowledge domains, can have a great impact in how we work with the information in a given field.

AI has been defined by these (possibly apocryphal) tests:

Any work done at Stanford, Carnegie Mellon, or MIT;
A software program capable of doing work which, if done
by a human, would be said to require intelligence; and
If it works, it's not AI!

These tests no longer apply. The parts of AI that relate to libraries and the complex processes going on inside libraries and other information handling and storage facilities will work if done correctly. AI now has a pragmatic definition which says in effect, if it works, we'll call it AI if we want to, but we really aren't interested in the name, just in the results. The best AI is invisible, buried so cleverly in the retrieval engine that we never notice its existence.

Another large part of the puzzle is the increasing interconnection of libraries. Blauer and Riggs discuss different strategies for expanding the horizons of researchers. Riggs shows how large numbers of specialized databases may be provided for students in the relatively protected environment of a large university campus. Access to the databases is virtually unlimited within the university. Librarians trying to modernize information access on a military installation should take notice.

Blauer discusses the robust OCLC network and the new directions it is taking. OCLC did not invent interlibrary loan and data sharing, but it certainly made the concepts easier to swallow. The evolution of OCLC from strict cataloging, to electronic communication for specialized purposes, to a broad spectrum vendor of information products is easy to understand in retrospect, less easy to have predicted.

Some of the resources, like OCLC, that we take as given in the Federal library world were not so easily assumed once, and may have to be fought for again. The tribulations of FEDLINK over the past two years, hinted at by Levering, could foreshadow major problems in procuring the specialized services libraries must have to survive.

Libraries will survive the 90's, and will do so as a result of their improving communication and their newly efficient networks rather than fading proudly in splendid isolation. Vannevar Bush held out the hope that all the knowledge a person could want could be stored in his desk; we know that however cleverly we stuff data into smaller and smaller boxes, we must accept that no library can meet everyone's needs. Cooperation carries the day, in the 1990's and beyond.

Edwin B. Burgess, Editor-in-Chief
TRADOC Library and Information Network (TRALINET)
8 January 1991

This volume would be incomplete without acknowledging the contributions of the staff of the TRADOC Library and Information Network (TRALINET) Center. James Byrn was the host and the ultimate impulse behind the conference. Janet Scheitle was in charge of organizing the overall operation and coordinated with the Wyndham Williamsburg Hotel. She was assisted by Tim Renick, Leslie Williams, and Chris Stokes, Librarian interns. Ed Burgess provided ADP support and coordinated the audio-visual equipment. Leslie Williams, Tim Renick, Chris Stokes, and Tina Pinnix staffed the conference information desk and ran innumerable errands. David Cundiff handled the financial matters. Alexandra Campbell, Frances Doyle, Bonita Epps, Ray Abell, Fred Mathews, and Ed Burgess introduced speakers and acted as MCs for different parts of the program. Judy McKimmey, Regina King, and Pamela Tijerina all assisted the editor in producing these proceedings.

LIBRARIES IN THE NINETIES AND BEYOND

BY

DR. THOMAS J. GALVIN

LIBRARIES IN THE 90'S AND BEYOND

by

THOMAS J. GALVIN

I am delighted to be here and to have a part in this conference. I had the pleasure of participating in the Military Librarians Workshop in 1981 at the Air University. I am looking forward, during the next two days, both to continuing my education about the world of military libraries and to finding out what new issues have emerged to challenge you since last we met.

The focus of this conference is on the decade ahead. Over the next two days, an impressive group of professional leaders will be helping all of us to anticipate the changes that are likely between now and the year 2000. To start things off, I'd like to focus this morning on some broad trends and emerging priorities that I think will have a significant impact on all types of libraries, including military libraries. I will also raise some perennial issues which are not new. These, like most of the real problems in life, often seem to be more for living with than for solving.

Let me begin by pointing out that, in thinking about the future, we need to look beyond developments just in our own field. We also have to be attentive to broader trends and directions in the larger world of which libraries are a part. As a profession, we sometimes seem to behave as if libraries existed in a vacuum. They clearly do not. Libraries are an integral part of a larger organizational, social, economic, technological and political environment. And they are highly sensitive to changes in that environment. If we have a collective shortcoming as a profession, it is that we too often find ourselves in the position of reacting to changes, rather than influencing changes, in the larger world. The organizers of this conference asked me to comment on whether libraries of all types are likely to become more proactive in their roles? The short answer is, "absolutely"! What I think we as a profession increasingly need to be about is making libraries a proactive force that shapes the character of organizational and societal change in the 1990's.

At the outset, I have to warn you that I'm not the world's best choice as a guide to the future. Like most people, I tend to do better in accounting for the past than in predicting what's ahead with any reasonable degree of accuracy. For example, my credentials as a futurist were badly tarnished a few years ago, when I became enamored of what was then a

hot new technology, the picturephone. I was so confident that the picturephone would revolutionize reference and information services within a decade that I unwisely predicted, in print no less, that by 1980 there would be a picturephone on the desk of every reference librarian. Would all of you who now have a picture phone at the reference desk in your library please raise your hands? Well, you see what you have to contend with.

As a futurist, I am the living embodiment of Doelger's Law. Doelger's Law reads: "Forecasting is a difficult thing, especially when it deals with the future." Doelger's Law, by the way, has an equally arresting corollary which states that "a leap beyond the state-of-the art may land you in a bucket of worms."

Despite my limitations as a forecaster, there are clearly some predictions about libraries in the next decade that even I can assert with a very high level of confidence. The first is that the pace of societal change will continue to accelerate dramatically in the 1990's. If you think the 80's were a turbulent time, you ain't seen nothing yet. Voter behavior in the Fall elections this year may well be an early signal that we are in for some radical disruption in the political environment over the next several years.

Nowhere is change likely to be more far reaching or more dramatic than in the defense community. The New York Times just last month examining the impact of the end of the Cold War on the military, noted that:

Thousands of soldiers who joined the all-volunteer force with the unspoken promise that their futures were secure...[have] been watching careers they counted on disappear. The Persian Gulf crisis may have only delayed the inevitable consequences of a shrinking military. (1)

To this civilian observer, who likes to fancy himself as being at least moderately well informed on current public issues, it seems clear that your primary clientele will have a greater need, and a more urgent need, than ever before for high quality, timely information. Information that will help them to deal with rapid, fundamental and in some cases wrenching organizational and personal change.

The military will have to be responsive to insistent fiscal and taxpayer pressures for downsizing. The current situation in the Middle East makes it apparent that, in the new world order, the military will also be required to perform a much more complex and varied mission. In turn, this will inevitably mean that you will be called on to

provide your clienteles with better access to higher quality information on a much more varied and diverse array of issues.

The need for rapid access to a larger universe of information clearly means that the primary role of local libraries will become more and more to serve as the point of electronic entry to an expanding range of remote data bases. Libraries will continue to invest more and more of their money in buying access to collections of information held by others, as they increasingly transform themselves into seamless gateways to national and international networks of knowledge.

For more than a decade, libraries of all types and sizes have been under insistent pressure to increase library productivity. "Doing more with less" has become a way of life for us. I have to tell you today that "doing more with less" seems likely to become an even more compelling mandate in decade ahead. In the 1990's your creativity will continue to be challenged. You will have to figure out how to respond to an increasing number of more urgent information needs with fewer of the conventional kinds of resources--dollars, people, money and space--than are available to you now.

Later today, you will be hearing from Dean Brooke Sheldon who has recently completed an important study of leadership in the management of library and information services. Her topic--leadership--is especially relevant to the decade just ahead. John P. Kotter, writing this Spring in the Harvard Business Review, provides an insightful and, I think, an important analysis of "leadership" by contrast with the more conventional notion of "management."

There is, John Kotter suggests, only one really important distinction between management and leadership. "Management," John Kotter asserts, "is about coping with complexity." "Leadership," by contrast, "is about coping with change." (2) And coping with change is what I believe military librarians will chiefly be about in the 1990's. So, I think all of us will want to pay particularly close attention to what Dean Sheldon has to say.

In an environment of rapid change, it will be essential for you to give careful attention to more rigorous and more precise definition of library goals and objectives. And it will become critically important to strengthen the accountability structure for library and information services, if you are going to compete effectively for scarce resources.

Historically, libraries have been plagued in the competition for resources by an inability to justify themselves in terms of

return on investment. The services we provide are, in most instances, extraordinarily difficult to quantify, to measure, and to place a dollar value on. The important work of the American Library Association's Public Library Association in developing output and performance measures for library service is, in my judgment, the key to demonstrating the value and the impact of the services that libraries provide.(3) Even college and university libraries, those bastions of bibliographic conservatism, are now starting to substitute output measures, such as the ability of the library to provide timely access to high demand titles, for the more traditional input measures such as dollars per student or number of volumes in the collection.

Closely linked to the newer focus on measuring the results that the library achieves is the work of James Matarazzo and Lawrence Prusak, supported by the Special Libraries Association. Matarazzo and Prusak have been trying to measure the impact of the corporate special library in terms of the value that management places on specific library and information services. Among the most striking conclusions reported in their recent study of 134 large U.S. corporations is that "most companies surveyed have no methods or processes in place to evaluate the effectiveness, efficiency, or productivity of what librarians do." Prusak and Matarazzo conclude that "everyone appears to 'like' libraries and librarians, but few firms think of them as 'mission critical.'"(3)

As Lowell Martin astutely points out, the classic dilemma for libraries of all types is "an overload of good works, an encumbrance of responsibilities."(4) I suspect that military libraries are no exception. The challenge to you in the decade ahead will be to prioritize that encumbrance of responsibilities. If we continue to try to do a little something for everybody, we will most assuredly end up not doing much that is considered to be of any great consequence for anybody.

There are simply too many good things that need doing. We will never have enough resources to do very many of them very well. We need to consciously commit the library to doing a few things as well as we possibly can. That means ignoring other needs that are equally deserving and equally meritorious. If we cannot bring ourselves to do that--to define organizational objectives at a level that is commensurate with organizational resources--then we risk spreading those limited resources so thinly that our libraries end up having no visible impact at all.

Setting firm priorities in this way is one of the hardest things that we as librarians are ever called upon to do. We are schooled in an egalitarian ethic. It is an article of faith with us that every request for service is meritorious, that we must try to respond to every need, that every person stands equal before the circulation desk. No other profession voluntarily imprisons its practitioners in such a narrow ethical cell. In a very real sense, such a simplistic professional code can become an excuse for failing to exercise appropriate professional judgment--an evasion of our professional responsibility. The brutal fact is, that in a climate of rising client expectations and diminishing organizational resources, either we will set the priorities in accordance with our best professional judgment, or they will be set for us by those who control the purse strings.

A particularly insidious response to the recent pressures to reduce the size and cost of government has been the wholesale and frequently mindless rush to privatization and to contracting out a wide range of essential government services, including library and information services. As many of you know far better than I, military libraries have not been spared as targets of the privatization axe.

I think we have to anticipate that this trend will continue. Libraries will remain vulnerable to the widely held perception, by those both outside and inside government that "the private sector can do it better and do it cheaper." You and I both know that this view is simplistic. But so long as we allow the perception of what libraries really do do, and what they can do, to remain fuzzy in the minds of the budget-makers, our libraries will continue to be at risk. We simply have to do a better job of formulating and articulating an exciting and compelling vision of what library and information services can be and what they should be. And we have to have more to offer the communities that we serve than just the status quo, something beyond just more of the same.

There is, I think, some disturbing evidence that our profession may be experiencing a collective failure of vision. Evidence that the pace of technological development [You knew that technology was bound to come in here someplace, didn't you?] is running too far ahead of our capacity to put that technology to the most effective use in serving our clientele. In a recent issue of Library Journal. Margaret Stieg observes, quite correctly I think, that "our ideas of what constitutes good service have not really changed in a century....Forged in the formative period of American librarianship," our current service goals," Stieg suggests, continue "to reflect the values of late 19th Century America."(5)

Margaret Stieg concludes that, because we have not been able to define and to commit ourselves to the new and higher levels of client service that the technology now empowers us to provide, we are at risk of confusing ends with means. We are in danger of making the technology itself both our goal and the central focus of the bibliographic enterprise.

Margaret Stieg writes "frequently librarians find themselves overwhelmed and frustrated. With time so short, they are forced to devote most of their energy to the format in which information appears, rather than [to] its content. They are becoming," she concludes, "technicians, removed by one level from putting patrons with what they want."(6)

Librarians clearly do need now, and will increasingly need in the future, high levels of staff technical expertise. But what we most emphatically do not need is to turn ourselves into a swarm of mindless machine attendants.

I am old enough to have survived several technological "revolutions" in librarianship. I came into the field in 1954 when library automation was the edge-notched punched card and the knitting needle. A quasi-mythical figure named Ralph Shaw at the Department of Agriculture Library was rumored to have figured out how to get a machine, which he called the "rapid selector," to sort those punched cards automatically.

I am a veteran of the microcard revolution, which promised to make it possible for a scholar to carry the contents of the Yale University Library around in a shoebox, the audio-visual media revolution, the computer revolution and the telecommunications revolution. And there are probably a few other minor palace coups that I've forgotten along the way. In any event, as a somewhat battle-scarred survivor of innumerable technological wars, what I think I have learned about technology comes down to essentially two things. One, to quote Russell Peterson, is that "each new advance serves not only to meet old needs, but to create new needs almost simultaneously."(7) And second, that Alexander Nehamas was unquestionably correct when he wrote in 1987 the "the importance of technology springs from deeper values and not from the nature of the machines themselves."(8)

The operative term here is "values." The greatest challenge to you as library and information professionals, working in increasingly technology-intensive environments, will be to distinguish as clearly as you possibly can between what technology makes it possible to do for people on the one hand, and what it is most desirable and most important to do first for people on the other. In short, we urgently need to prioritize our service goals, as I suggested to you a few moments ago. We

also need to redefine those goals in the context of a vastly more powerful and continually expanding range of technological options.

It is axiomatic that information technology will continue to improve at a rapid rate. That technology, if we can collectively decide what are the most important things to apply it to, represents one of our best hopes for responding to the challenge to increase library productivity. In particular, I think the area of artificial intelligence, in its application to expert systems, which we are to hear more about later in this workshop, offers enormous promise to empower the information-seeking process and to free librarians from some of the more routine tasks of file searching.

The watchwords, at least for the early part of the 1990's, will be networking, interconnectivity, interoperability and the convergence of technologies. The era of proprietary, stand-alone, single function automated systems in libraries is clearly at an end. What is more exciting, and I think potentially more important for us, is the growing capability to integrate text, data, graphics, voice, still and moving images in the output of a single terminal. Nicholas Negroponte of MIT's legendary Media Lab believes that "the computer and the TV will shortly be one and the same." (10) And the proposed National Research and Education Network, combined with the installation of fibre optic at the level of the local loop, promises to create a broad-band electronic highway to support information sharing at both the national and international levels.

It is also clear that the library and information services market is finally emerging as a significant force in shaping a new generation of customized information products and services. Along with becoming much more sophisticated consumers of information technology, I believe that in the decade ahead we will become much more demanding of those vendors who seek to serve the library market. And I have high hopes that we will finally develop the ability to link enhanced technological capabilities in a tangible and persuasive way to improved service to clients.

To summarize, as I look ahead with you to the 1990,s and beyond, I see a time of enormous opportunity for military libraries, combined with continuing challenge. Libraries will have to compete even more aggressively for resources. That competition will take place in a climate of stricter organizational accountability for the manner in which resources are used and especially for the results that are achieved. New technology will give us the potential to achieve an incremental upgrading of services. But along with that increased potential

will come an even more urgent need to prioritize library goals. Willingly or unwillingly I believe we will have to differentiate in the level of service we provide to individuals within the library's overall clientele.

There is clearly much to challenge you in the decade ahead. But there exists, as well, an unusual and exciting opportunity to make a virtue of necessity, to forge a new and compelling vision for library and information services, to define a much more central role for libraries in the future. Charles DeGaulle, when he was President of France, is said to have had four maxims which he regarded as critical for success. DeGaulle's first maxim's was "seize the inevitable"! His second rule was "never relinquish the initiative"! Both of those strike me as eminently sound principles for library managers to apply in the decade ahead. "Seize the inevitable" and "never relinquish the initiative"!

[Incidentally, in case you're wondering about DeGaulle's third and fourth maxims, they were "always stay 'in' with the 'outs'" and "never get between a dog and a lamppost."]

Change is an inevitable condition of organizational life. Peter Drucker is surely on target when he asserts that what we need in service organizations like libraries are "fewer problem solvers and more opportunity seekers." I challenge you to become "opportunity seekers" in your organizations in the 1990's. I am confident that you will be equal to that challenge.

NOTES

- 1) New York Times, September 21, 1990.
- 2) John P. Kotter. "What Leaders Really Do." Harvard Business Review, May-June, 1990, p. 104.
- 3) Charles R. McClure and others. Planning and Role Setting for Public Libraries. Chicago: American Library Association, 1987.

Nancy A. Van House and others. Output Measures for Public Libraries. 2d ed. Chicago: American Library Association, 1987.
- 4) Lawrence Prusak and James M. Matarazzo. "Tactics for Corporate Library Success." Library Journal, September 15, 1990, p. 45.
- 5) Lowell A. Martin. The Public Library: Middle Age Crisis or Old Age? New York: Bowker, 1983.
- 6) Margaret F. Stieg. "Technology and the Concept of Reference, or What Will Happen to the Milkman's Cow?" Library Journal, April 15, 1990, p. 47.
- 7) Ibid. p.48.
- 8) Russell W. Peterson. "Impacts of Technology." American Scientist, January-February, 1979, p. 28.
- 9) Alexander Nehamas. "The Poet as Efficiency Expert." New York Times Book Review, April 19, 1987.
- 10) Nicholas Negroponte. "Inventing the Future." Keynote Address, Government Technology Conference, Albany, N.Y., September 26, 1990.

DEMOGRAPHICS OF LIBRARY CUSTOMERS 1990-2000

BY

DR. PHILIP A. D. SCHNEIDER

**A PRESENTATION FOR THE
34TH MILITARY LIBRARIANS WORKSHOP
U.S. ARMY TRAINING AND DOCTRINE COMMAND
Williamsburg, Virginia
October 10, 1990**

I. DEMOGRAPHICS OF LIBRARY CUSTOMERS 1990-2000

II. THE COMMUNITY OF FEDERAL LIBRARIANS

BY

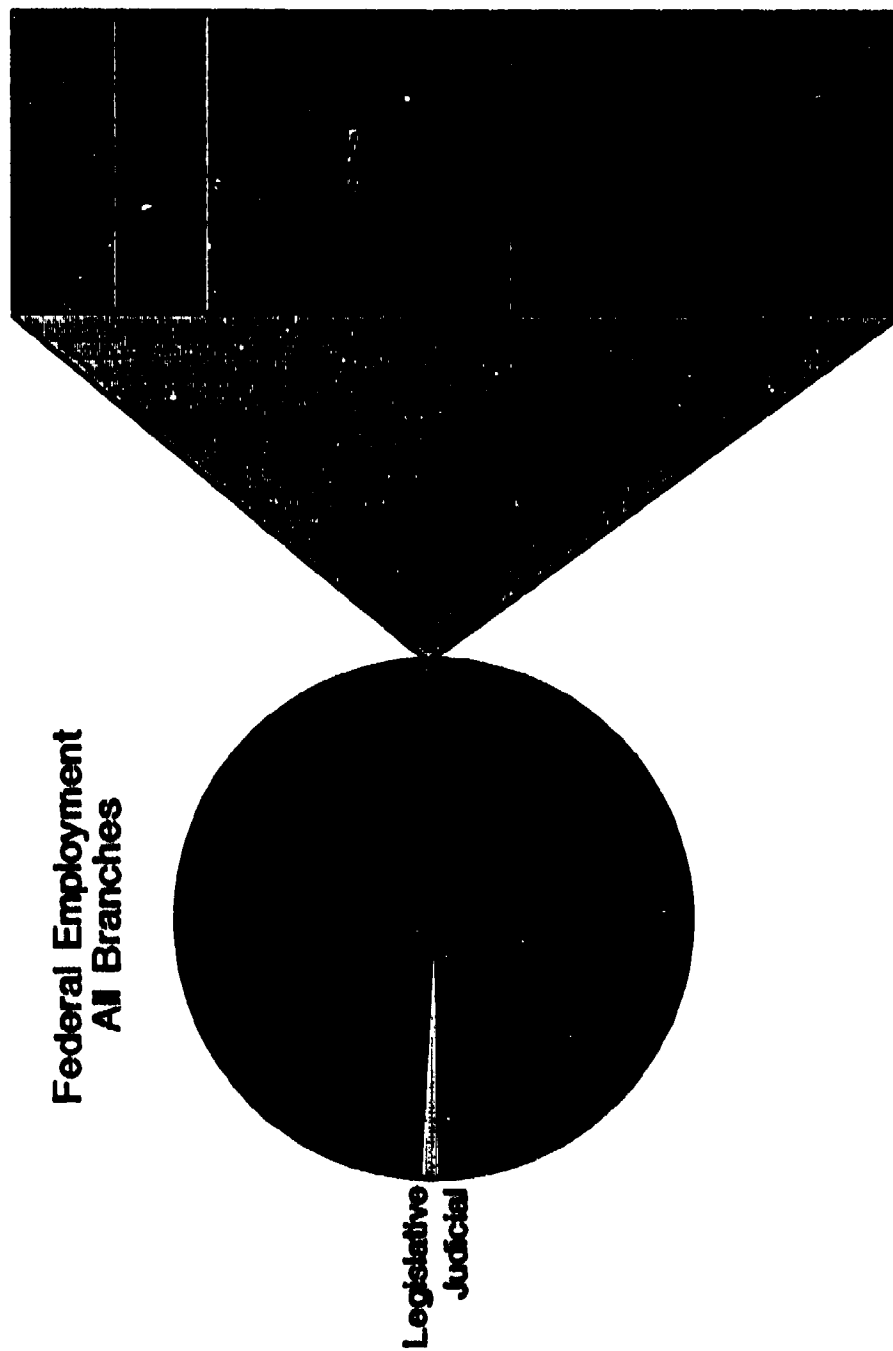
**Phillp A. D. Schnelder, Ph.D.
Assistant Director for Workforce Information
Personnel Systems and Oversight Group
U.S. Office of Personnel Management**



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Office of Workforce Information
U. S. Office of Personnel Management

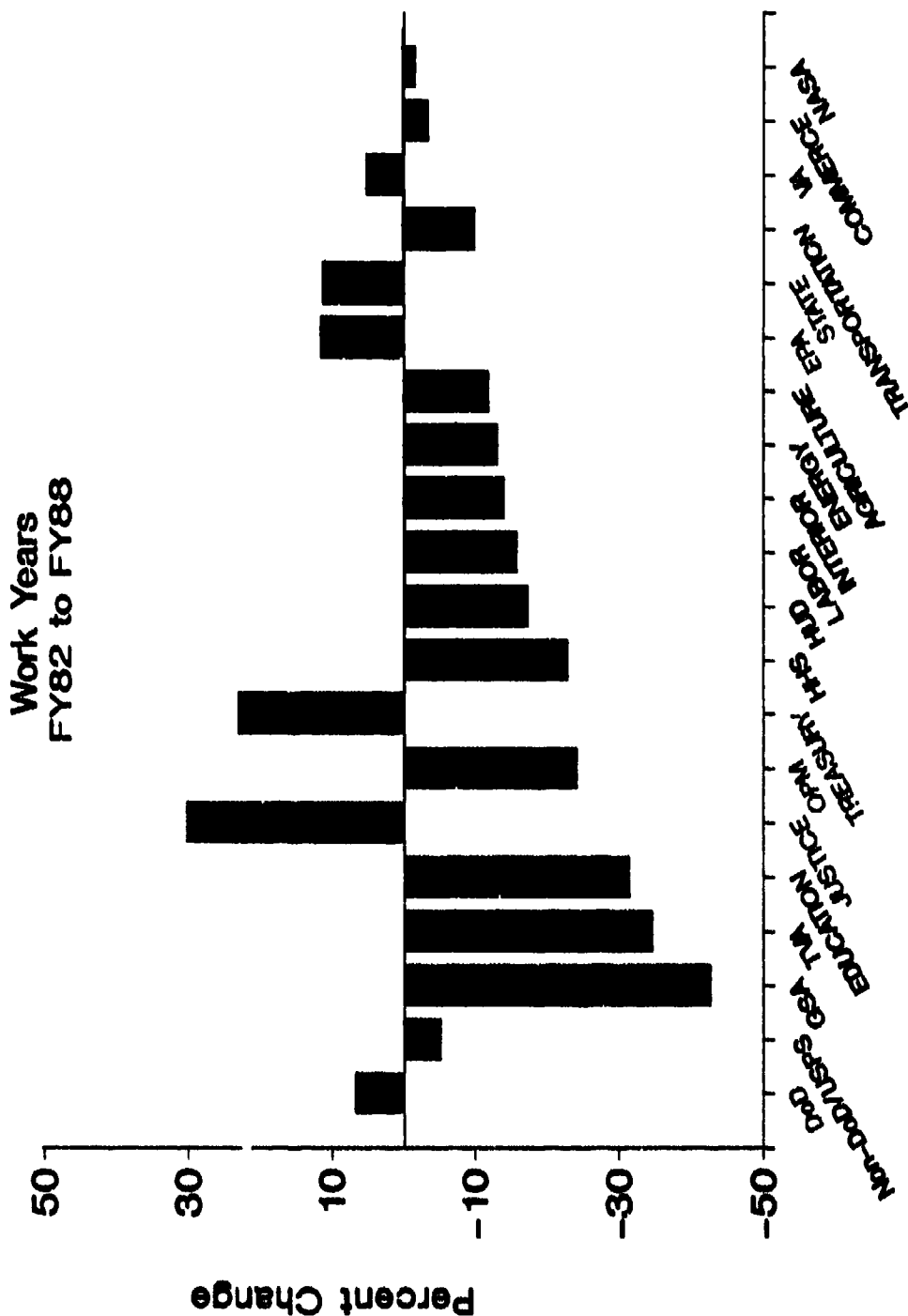
FIVE AGENCIES EMPLOY THREE-FOURTHS OF WORKFORCE



FIVE AGENCIES EMPLOY THREE-FOURTHS OF WORKFORCE

Total Federal Workforce	3,112,823	100.0%
* Legislative Branch	37,547	1.3%
* Judicial Branch	21,502	0.7%
* Executive Branch	3,053,774	98%
USPS & PRC	832,014	27%
Defense	1,049,574	34%
VA	245,467	8%
Treasury	160,516	5%
HHS	123,270	4%
All Other	642,887	21%

SOME AGENCIES GROW, MOST DON'T



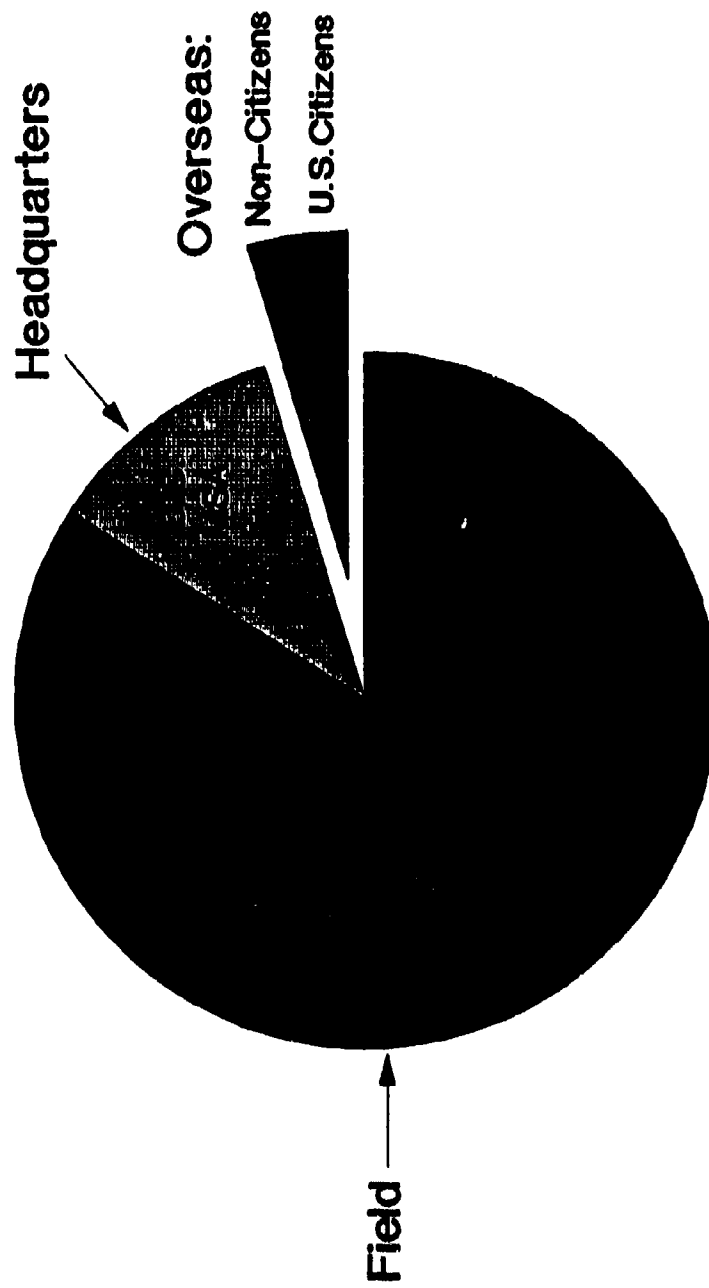
SOME AGENCIES GROW, MOST DON'T

(FY 82 to FY 88)

VA	+ 5.3%	GSA	- 42.7%
Defense	+ 6.8%	TVA	- 34.5%
State	+ 11.3%	Education	- 31.6%
EPA	+ 11.5%	OPM	- 24.1%
Treas	+ 23.1%	HHS	- 22.9%
Justice	+ 30.4%	HUD	- 17.4%
		Labor	- 15.8%
		Interior	- 13.9%
		DoE	- 13.1%
		Agric.	- 11.4%
		Transp.	- 9.9%
		Commerce	- 3.4%
		NASA	- 1.6%

* (Total non-postal, non-defense change was - 5.1% -- 60,000 work years.)

MOST EMPLOYEES ARE LOCATED IN THE FIELD



MOST EMPLOYEES ARE LOCATED IN THE FIELD

* Trend of Employment in Washington DC Area:

	<u>1960</u>	<u>1970</u>	<u>1980</u>	<u>1988</u>
	233,479	316,738	365,166	351,324
% of Total Feds	9.6	10.6	12.2	11.3
(w/o USPS)	12.0	13.2	15.0	14.4

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DC Area includes the District of Columbia; Arlington, Fairfax, Loudoun, Prince William and Stafford Counties, and Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park Cities in Virginia; and Calvert, Charles, Frederick, Montgomery, and Prince Georges Counties in Maryland.

* Overseas Employment Includes:

Citizens -- 81,000

Non-Citizens -- 63,500

Dept. of Defense Indirect Hire Employees -- 80,000

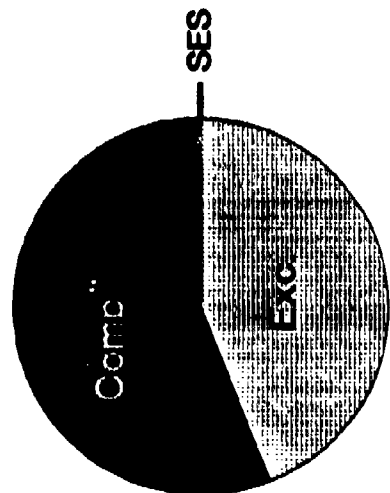
FEDERAL EMPLOYMENT IS WIDELY DISPERSED



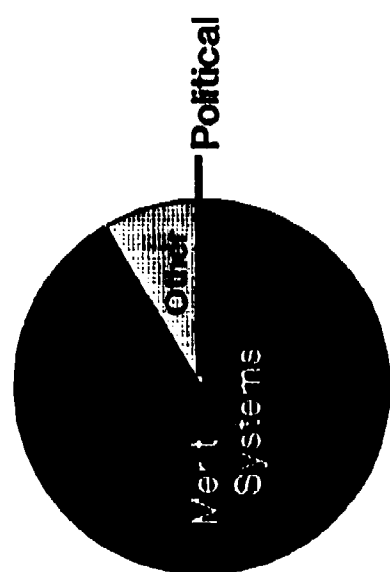
FEDERAL EMPLOYMENT IS WIDELY DISPERSED

- * Eight states have more than 100,000 Federal Civilian Employees: California, Texas, Illinois, Florida, Virginia, Maryland, Pennsylvania, and New York**
- * Nearly 11.3% are employed in the Washington, DC area**
- * There are 18,500 civilian employees in US Territories and 126,000 in foreign countries**

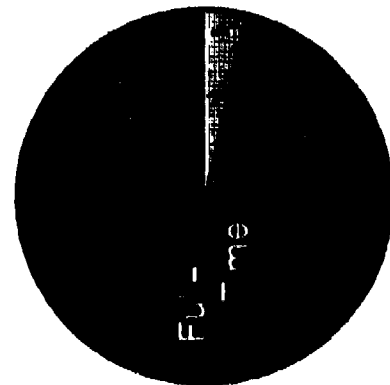
THE FEDERAL WORKFORCE VIEWED IN DIFFERENT WAYS



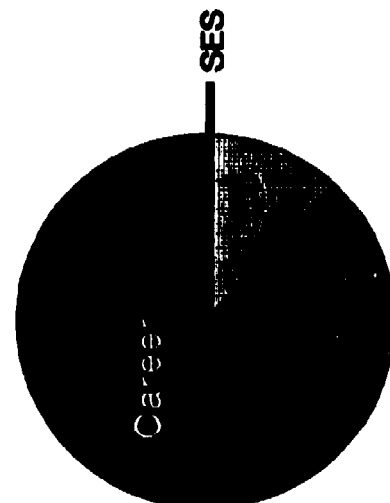
Appointment Type



Recruitment Method



Work Schedule



Tenure

THE FEDERAL WORKFORCE VIEWED IN DIFFERENT WAYS

<u>Category and Components</u>	<u>Employment</u>	
* Competitive Service	1,733,000	56 %
* Comp. Svc. & Comparable Merit Systems	2,747,375	88 %
* Political Appointees (EX, SES, NEA, Sch. C)	3,787	< 0.1 %
* Emp. Under Other Selection Procedures	344,880	11 %
Congress (Members and Staff)	19,200	
Judicial Branch	21,006	
Experts and Consultants	5,613	
Veterans Readjustment Appointments	24,975	
Foreign Nationals Employed Overseas	63,522	
Schedule A and B	154,721	
Army & Air Force National Guard	48,887	

* Full-Time Permanent	2,588,700	83 %
* Temporary and Indefinite Appts.	349,600	11 %
* Career and Career Conditional (Comp. Svc.)	1,646,635	

* In the Civilian Labor Force, 82% are FT, 17% are PT, and 1% are Intermittent

Profile of the Typical Federal Civilian Non-Postal Employee March 31, 1990

by Christine E. Steele

Introduction

The "typical Federal civilian employee" is a topic of frequent interest for the news media, businesses, private citizens and organizations as well as the Congress, White House, and other Federal agencies. This factsheet lists the summary statistics often requested for speeches, letters and reports. (Data are for total on-board employment unless otherwise indicated (i.e., all work schedules) and may differ from other releases due to coverage - e.g., agency, work schedule, tenure - and as-of dates.)

Demographic Characteristics

Age 42.1 years average for full-time permanent employees
Length of Service 13.2 years average for full-time permanent employees
Retirement Eligibility 8% of full-time permanents covered under Civil Service Retirement (excluding hires since January 1984)
Education Level 34% have Bachelor's Degree or higher degree
Gender 57% men and 43% women
Race and National Origin 27.4% minority group members: 16.8% Black, 5.3% Hispanic, 3.5% Asian/Pacific Islander, 1.8% Native American
Handicapped Status 7% have handicaps
Veterans Preference 30% have veterans preference (17% are Vietnam Era veterans)
Retired Military 5.0% of total: 0.5% officers and 4.5% enlisted personnel

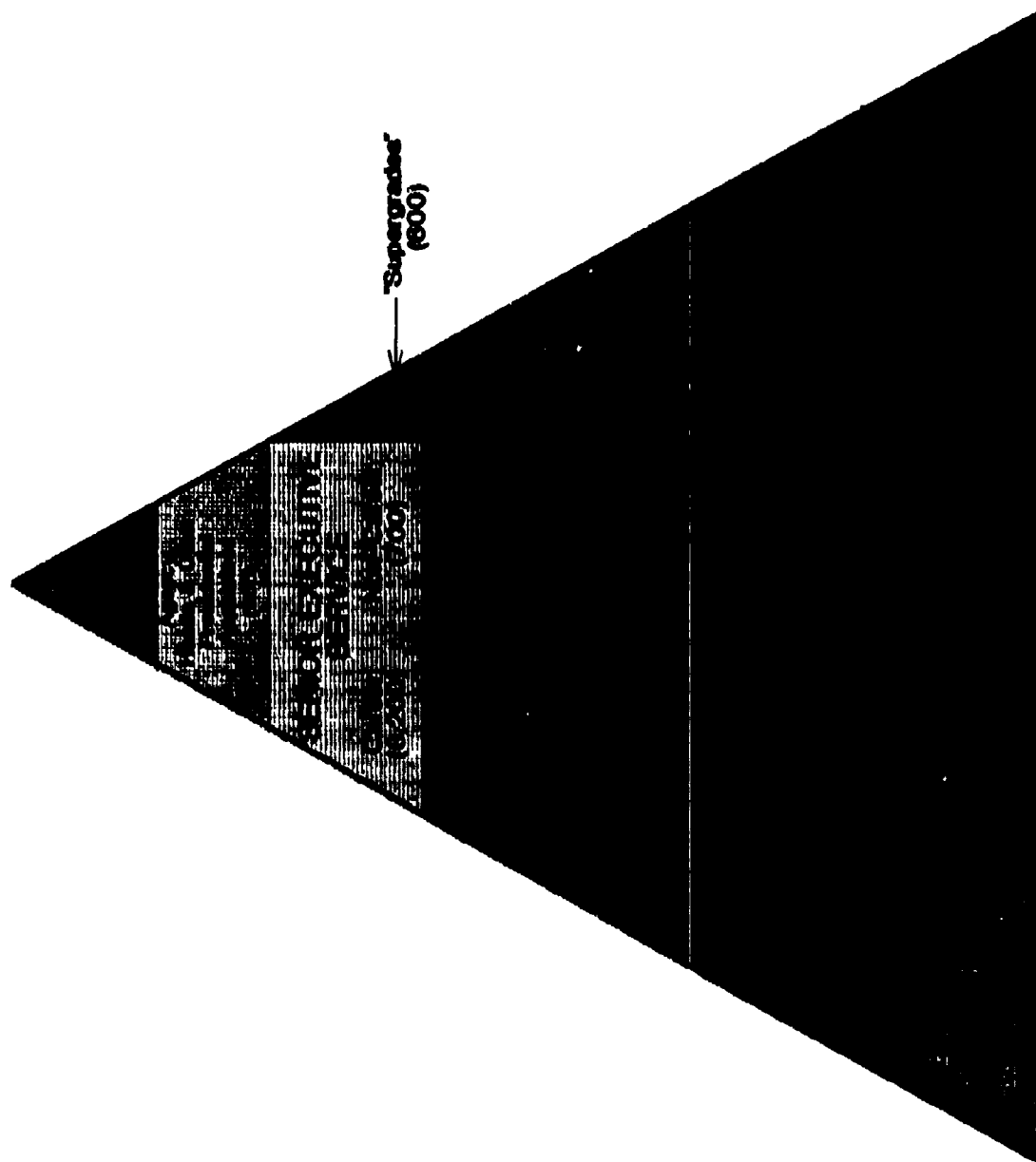
Job Characteristics

Annual Base Salary \$31,565 average for full-time permanent employees; \$39,472 in Wash., D.C.
Special Rates 10.6% paid higher rates for retention in shortage occupations
Grade 8.6 average General Schedule grade
Pay System 73% General Schedule, 18% wage systems, 9% others
Work Schedule 82.4% full-time, 4.3% part-time and 3.3% intermittent
Tenure 89.5% permanent appointments 87% full-time permanent appointments
Occupation and PATCO 82.6% White-Collar (21.3% Professional, 23.5% Administrative 17.2% Technical, 18.6% Clerical, 2.1% Other), 17.4% Blue-Collar
Supervisory Status 10.4% Supervisors, 1.4% Managers, and 0.5% Executives
Union Representation 75% eligible and 60% represented
Service (Position Occupied) 81.3% Competitive, 18.4% Excepted, and 0.3% Senior Executive Service
Agency 47.1% Dept of Defense and 11.6% Dept of Veterans Affairs
Geographic Location 96% USA and 14% Washington, DC Metropolitan Area
Retirement Plan 54.7% Civil Service Retirement (including 1.7% in special plan for law enforcement and firefighter personnel)
2.6% Civil Service Retirement and Social Security,
33.6% Federal Employees Retirement System and Social Security,
7.2% Social Security only,
0.7% Foreign Service Retirement or other system, 0.8% none.
Life Insurance 92% eligible for Federal Employees' Group Life Insurance: 15% waived, 26% have basic coverage and 51% have more than basic coverage

Data Source

U.S. Office of Personnel Management's Central Personnel Data File covers Federal civilian employees except Members and employees of Congress, Architect of the Capitol, Botanic Garden, Library of Congress, Congressional Budget Office, Copyright Royalty Tribunal, Office of Technology Assessment, Judicial Branch, White House Office, Office of the Vice President, Federal Reserve Board, U.S. Postal Service, Postal Rate Commission, Tennessee Valley Authority, Defense Intelligence Agency, Central Intelligence Agency, National Security Agency, foreign nationals employed overseas, and temporary census enumerators.

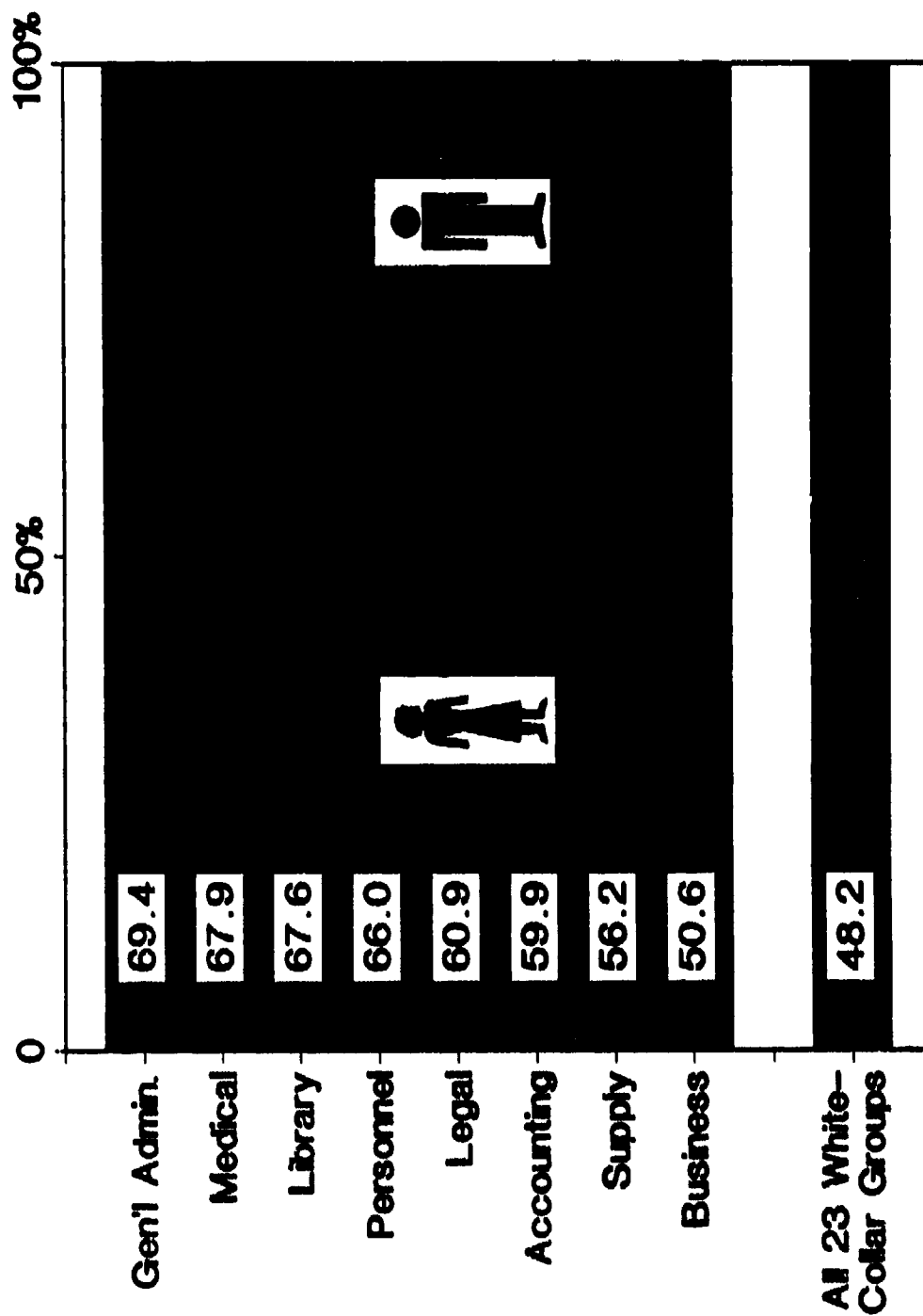
MOST EMPLOYEES PAID UNDER THE GENERAL SCHEDULE



MOST EMPLOYEES PAID UNDER THE GENERAL SCHEDULE

- * General Schedule covers 1,483,000 or over 70% of non-postal Executive Branch employment (2,100,000)**
- * There are 90 pay plans that cover the remaining 30% of the non-postal Federal workforce**
- * Blue-collar is 18% of non-postal Executive Branch**
- * Supervisor/Manager/Executive to employee ratio is 1:8**

WOMEN DOMINATE EIGHT OCCUPATION GROUPS



Full-Time Employment

WOMEN DOMINATE EIGHT OCCUPATIONAL GROUPS

- * Full-time employment of women has increased by more than 125,000 since 1976
- * 47% of women in the eight groups dominated by women are clerical, but 71% of these are in the General Administration group
- * From 1976 to 1986, the percent of women in GS 9-12 and GS 13-15 has dramatically increased, with two-thirds of women employees under the age of 35 in grades 9-15:

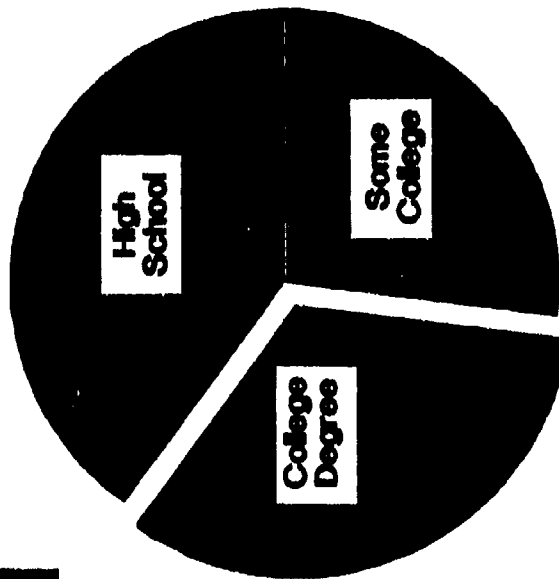
	% of Women Under Age 35		% of Women Over Age 35	
	<u>1976</u>	<u>1986</u>	<u>1976</u>	<u>1986</u>
Who are GS 9/12	22.6	40.3	19.4	31.6
GS 13/15	9.5	27.4	4.7	11.2

- * For the cohort of women hired into clerical jobs in 1976, 24% have moved to Administrative jobs, 24% to Technical jobs, 2% to Professional jobs, 3% to Blue Collar jobs, and 47% remain in clerical jobs

OVER ONE-THIRD HAVE COLLEGE DEGREES

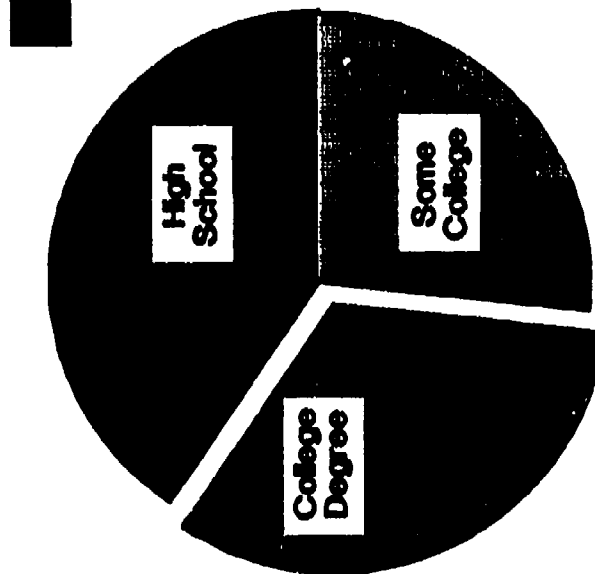
BY GENDER

Women



BY RACE

Minorities



In the Civilian Labor Force, 23% Have College Degrees

OVER ONE-THIRD HAVE COLLEGE DEGREES

*** In the Federal civilian workforce:**

40 % of men and 22 % of women are college graduates
22 % of minorities and 37 % of non-minorities are college graduates

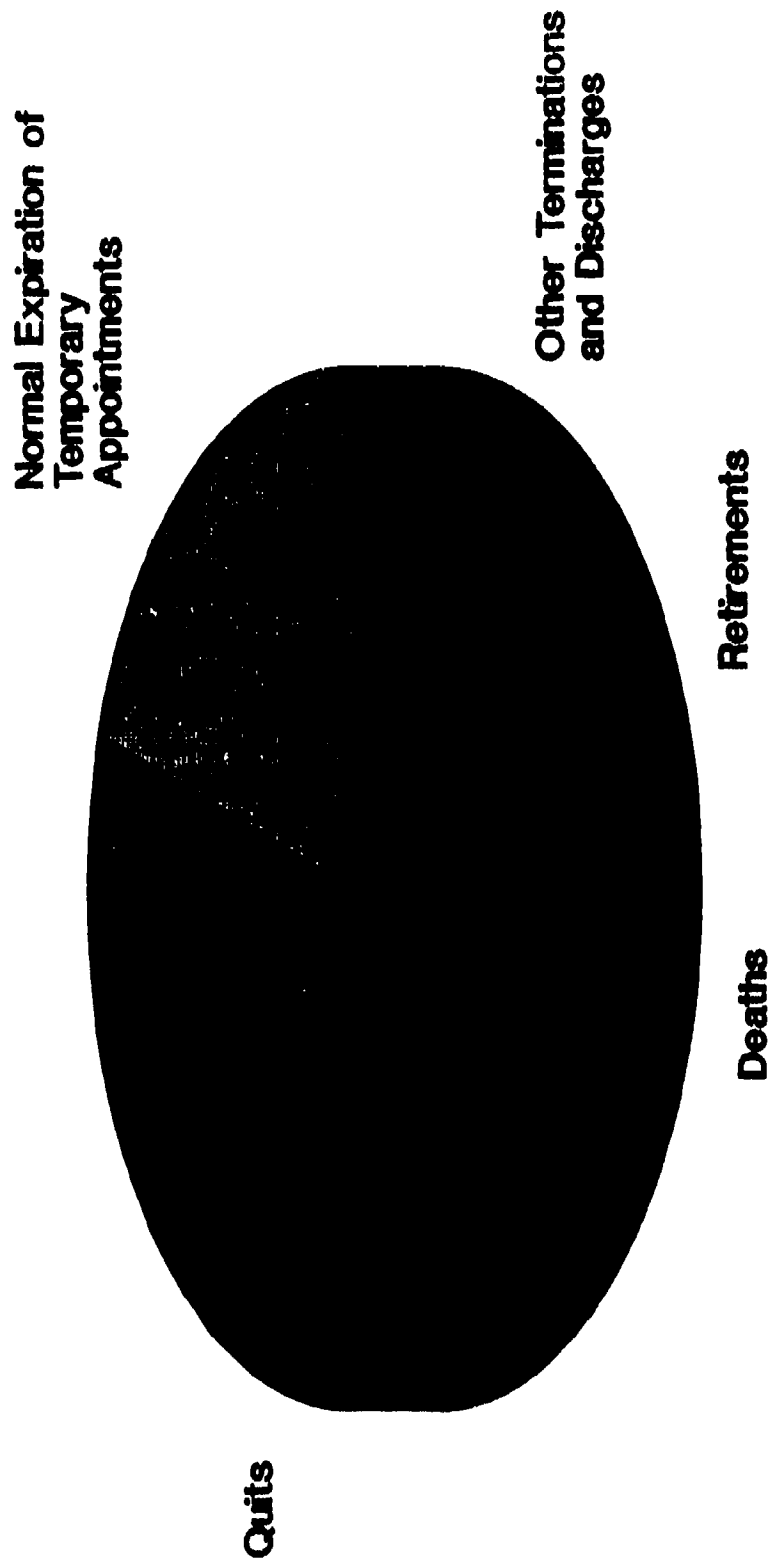
*** In the nation's civilian labor force only 22.9% are college graduates**

B-19

*** Federal civilian education levels have increased dramatically for some groups:**

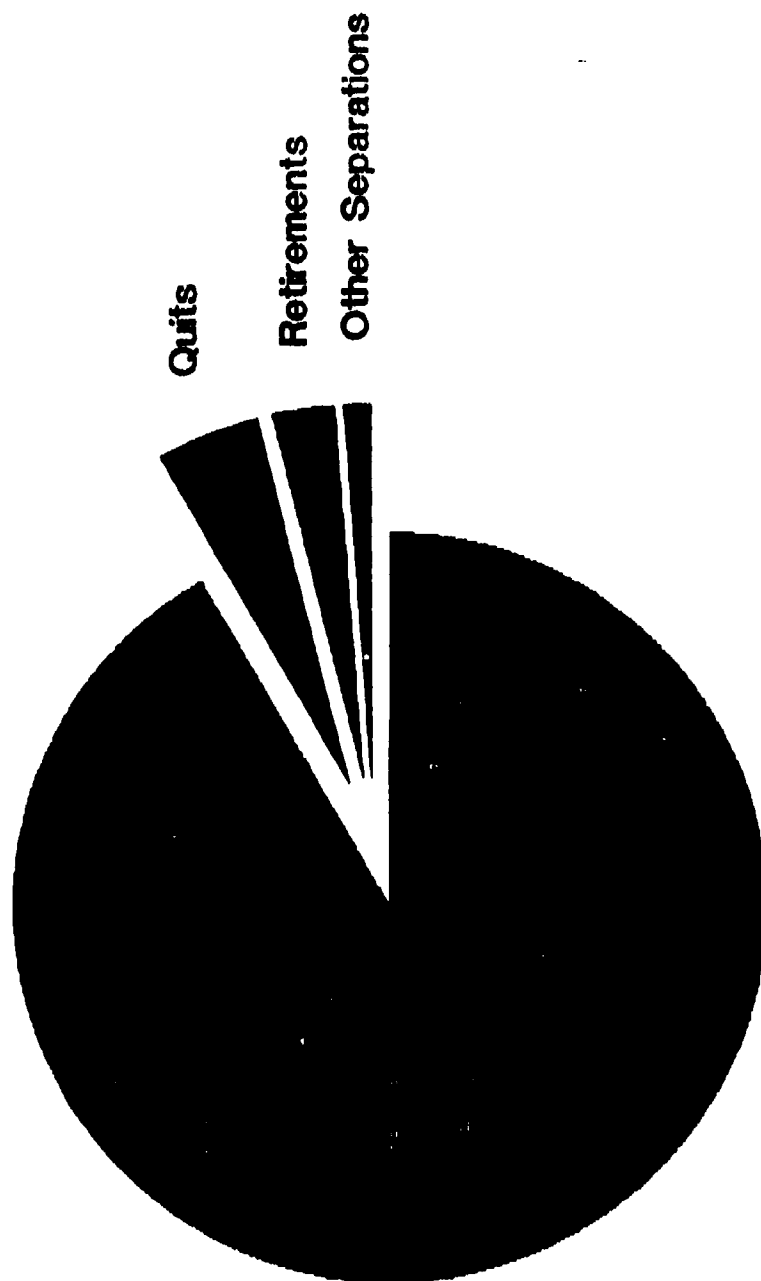
	<u>1978</u>		<u>1988</u>	
	Black	Hispanic	Black	Hispanic
% that are College Grad.	11	13	13	22
% that are H. S. Dropout	21	21	7	6

ONE-SIXTH OF THE WORKFORCE LEAVES EACH YEAR



(Example: 371,000 Non-Postal Separations in FY1987)

LESS TURNOVER IN FULL-TIME PERMANENT



Fiscal Year 1987

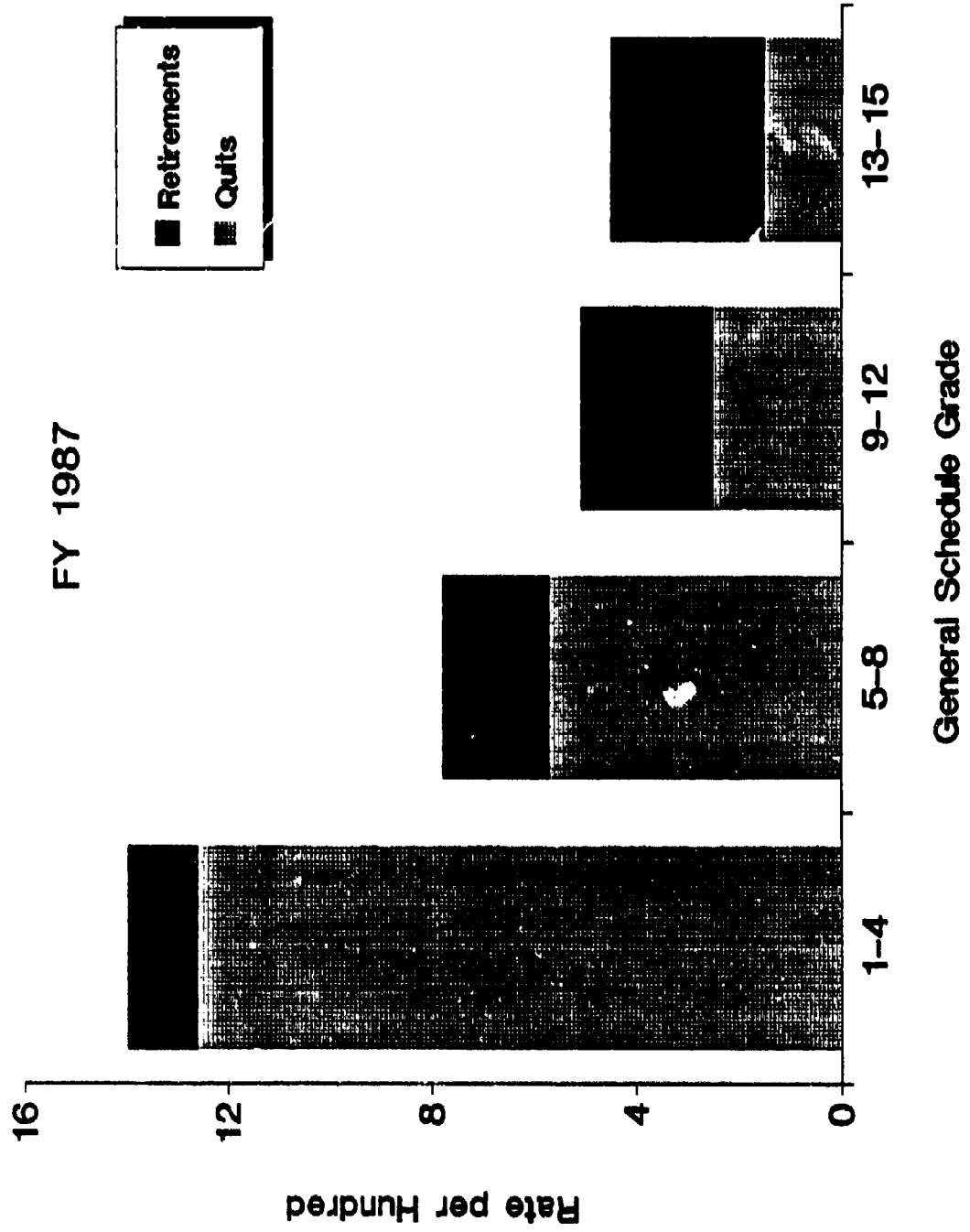
LESS TURNOVER IN FULL-TIME PERMANENT

- * Only about 8 of every 100 full-time permanent employees left government service in FY 87
- * Quits represent 50-55% of FTP separations in a typical year

FTP GS, GM, and Wage (Fiscal Year 1987)

<u>Personnel Action</u>	<u>Percent of Employees</u>
Quit	4.4
Retirement	2.7
Other	1.2
Those Remaining	91.7

THE HIGHER THE GRADE, THE LESS THE TURNOVER



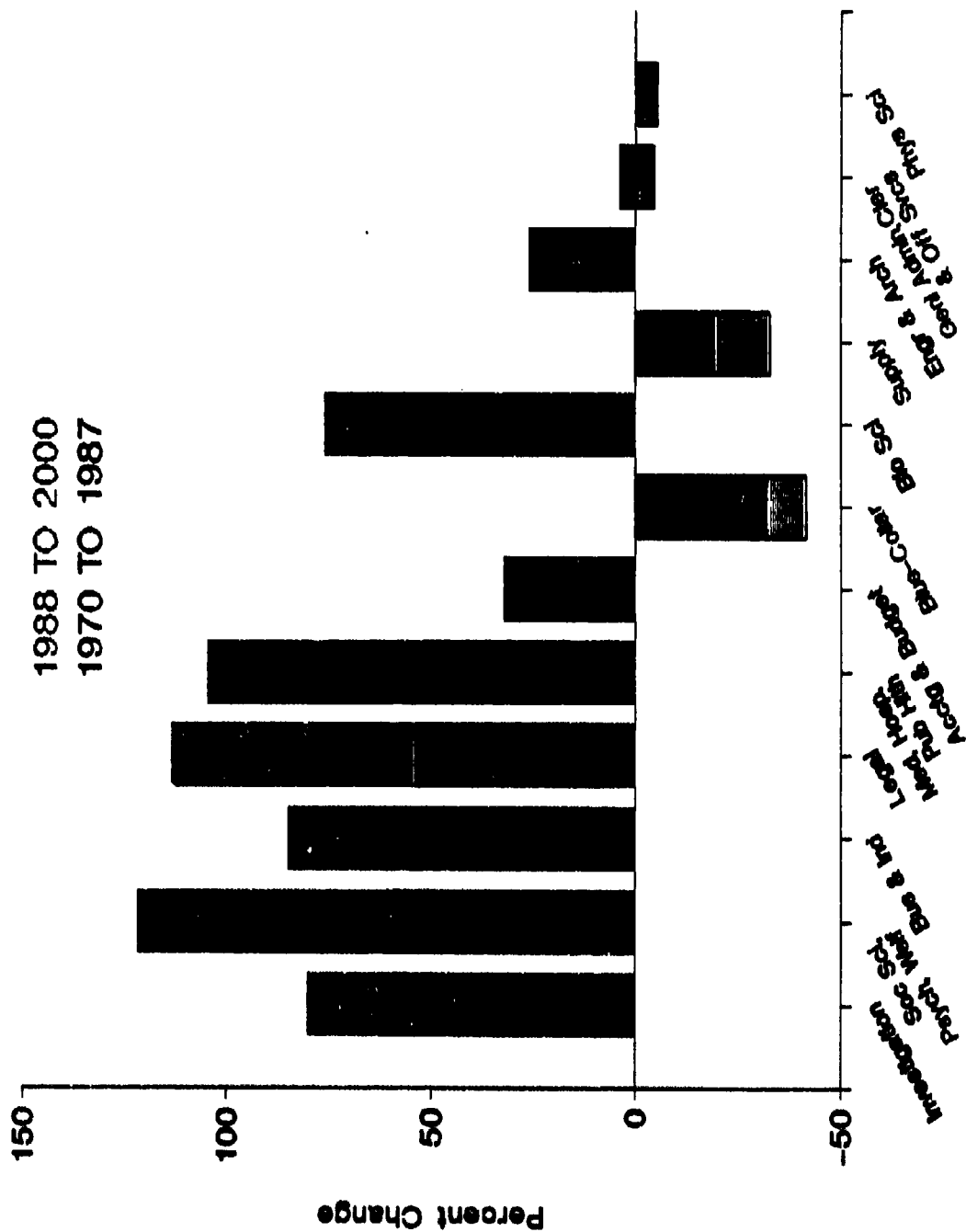
THE HIGHER THE GRADE, THE LESS THE TURNOVER

* Turnover occurs at a much higher rate at the lower grades of the General Schedule

* At higher grades, retirements occurred in FY 1987 at a higher rate than quits in the full-time permanent workforce:

<u>Grade</u>	<u>Employment</u>	<u>Quit</u> <u>Rate</u>	<u>Ret</u> <u>Rate</u>	<u>Quit + Ret</u> <u>Rate</u>
1-4	194,000	12.6%	1.4%	14.0%
5-8	441,000	5.7%	2.1%	7.8%
9-12	538,000	2.5%	2.6%	5.1%
13-15	210,000	1.5%	3.0%	4.5%

SIZABLE CHANGES IN OCCUPATIONS



SIZABLE CHANGES IN OCCUPATIONS

1970 - 2000

- * Shifting priorities: Investigations + 63%**
- * Service Workloads Increase: Social Sciences + 61% and Medical + 52%**
- * Automation had modest overall effect on general administrative, clerical, and office services: + 4%. But clerks were down 11%, while computer specialists more than doubled (+ 122%) to 44,000**
- * Women now hold 30% of General Attorney jobs, and 36% of Administrative (non-clerical) jobs**
- * By the year 2000, there are projected to be 157,000 new white collar jobs and 107,000 fewer blue collar jobs**

Table 1-5
Federal White Collar Employment Will Grow During
the 1990s
(Totals in Thousands)

Occupational Group*	1970	1985	2000	Increase 1985-2000
Miscellaneous Occupations	40.3	54.6	66.1	24.6%
Social Science	34.1	37.0	78.7	32.6%
Personnel Management	37.0	80.4	60.2	19.4%
Administrative and Clerical	438.9	430.3	416.3	-7.0%
Biological Sciences	41.5	54.6	73.0	33.2%
Accounting and Budget	107.7	132.7	142.2	7.1%
Medical and other Health	93.3	141.7	191.0	34.8%
Veterinary Medical Science	2.3	2.7	3.6	29.6%
Engineering & Architecture	147.9	167.0	186.6	11.8%
Legal and Kindred	47.7	74.7	102.1	36.8%
Information and Arts	19.4	21.7	22.6	3.6%
Business and Industry	64.0	99.3	118.3	24.2%
Copyright, Patent, Trademark	1.6	2.0	2.3	14.7%
Physical Sciences	42.9	44.4	46.1	1.6%
Library and Archives	6.5	10.1	11.7	16.3%
Mathematics & Statistics	10.9	15.4	16.1	-1.5%
Equipment, Facilities, Services	17.4	17.7	16.6	-6.2%
Education	26.7	30.3	30.5	0.6%
Investigation	36.9	56.4	70.2	24.4%
Quality Assurance and Inspection	21.4	19.5	18.4	-15.8%
Supply	71.6	60.5	46.0	-20.7%
Transportation	41.6	41.3	41.4	0.1%
All White Collar	1,380.9	1,600.6	1,767.2	9.8%
All Blue Collar	836.3	423.1	316.3	-25.3%
Total	1,899.4	2,023.7	2,083.6	3.0%

*Excludes the Postal Service

Source: Office of Personnel Management, Occupations of Federal White Collar and Blue Collar Workers, October 31, 1985; Hudson Institute projections.

Table 1-3

The Language Skills Required For Federal Jobs Will Rise By the Year 2000

	MEAN LANGUAGE SKILL RATING	EMPLOYED 1980	NEW JOBS 1980-2000	RATE OF GROWTH
Lawyers & Judges	5.2	14,062	2,872	15.44%
Natural & Computer				
Scientists	5.0	100,446	8,920	8.32
Social Scientists	5.1	17,622	821	3.06
Health Treatment				
Occupations	5.1	86,187	4,748	5.31
Subtotal: GED 5.1 - 5.9		231,251	15,880	6.57%
Engineers, Architects, &				
Surveyors	5.0	110,253	10,400	17.09%
Social, Recreational &				
Religious Workers	4.8	7,970	448	5.60
Teachers, Librarians, &				
Counselors	4.5	23,063	71	0.31
Management Related				
Occupations	4.4	206,130	20,401	9.89
Writers & Artists,				
Entertainers	4.1	14,547	801	5.43
Subtotal: GED 4.1 - 5.0		453,912	30,480	11.15%
Other Professionals &				
Paraprofessionals	4.8	143,644	7,500	5.27%
Technicians	4.9	187,812	17,000	9.09
Marketing and Sales				
Occupations	3.8	10,000	604	5.99
Non-coll. Worker				
Supervisors	3.1	30,782	3,300	8.50
Subtotal: GED 3.1 - 4.9		392,618	28,382	7.04%
Administrative Support				
Occupations	2.9	530,632	(90,200)	-12.67%
Construction, Trades				
Plant and System	2.9	46,000	2,551	5.56
Occupations	2.7	9,224	405	4.39
Service Occupations				
Mechanics, Installers, &	2.6	131,057	8,040	6.31
Repairs				
Precision Production	2.6	130,743	11,081	8.08
Occupations				
Occupations	2.3	45,612	770	0.41
Agriculture, Forestry &				
Fishing	2.3	32,340	1,410	0.37

Table 1-6 (Continued)

The Language Skills Required For Federal Jobs Will Rise By the Year 2000

	MEAN LANGUAGE SKILL RATING	EMPLOYED 1980	NEW JOBS 1980-2000	RATE OF GROWTH
Subtotal: GED 2.1 - 3.0		912,206	(60,147)	-5.00%
Material Handling &				
Vehicle Operators	2.0	31,566	140	0.12%
Extraction & Related				
Workers	1.7	800	30	5.00
Machinists, Setters,				
Operators & Tenders	1.6	10,071	376	2.26
Hand Working				
Occupations &				
Assemblers	1.5	14,071	1,004	7.15
Helpers & Laborers	1.3	64,830	(2,790)	-4.26
Subtotal: GED 1.0 - 2.0		130,207	(1,183)	-0.92%
Total		2,300,904	47,601	2.25%

*Average General Educational Development (GED) Score.
Source: U.S. Bureau of Labor Statistics; Hudson Institute.

Table 1-7

The Math Skills Required For Federal Workers Will Rise By the Year 2000

	MEAN MATH SKILL RATING	EMPLOYED 1988	NEW JOBS 1988-2000	RATE OF GROWTH
Natural & Computer Scientists Engineers, Architects, & Surveyors	5.7	188,448	6,828	3.37%
	5.1	114,253	10,488	17.88
Subtotal: CED 5.1 - 6.9		210,883	28,488	12.87%
Social Scientists Health Treatment Occupations	4.5	17,822	521	3.89%
Management Related Occupations	4.4	88,187	4,748	5.51
Lawyers & Judges	4.2	288,128	28,481	9.88
	4.1	14,882	2,872	15.44
Subtotal: CED 4.1 - 4.9		418,958	37,838	8.97%
Technicians Teachers, Librarians, & Computer Marketing and Sales Occupations	3.8	187,412	7,588	4.94%
	3.3	23,883	71	0.31
	3.3	18,888	824	5.88
Social, Recreational & Religious Workers Other Professionals & Paraprofessionals	3.2	7,818	448	5.88
	3.2	143,884	7,588	5.27
Non-college Worker Supervisors	3.0	38,782	3,388	8.58
Subtotal: CED 3.1 - 4.0		388,483	18,883	5.17%
Construction Trades Writers & Artists, Entertainers Administrative Support Occupations	2.8	45,888	2,852	5.97%
	2.7	14,547	881	6.81
	2.7	838,832	(88,388)	-12.87
Plant and System Occupations	2.7	8,224	485	4.38
Mechanics, Installers, & Repairs	2.5	138,743	11,851	8.88
Service Occupations Precision Production Occupations	2.3	131,887	8,488	4.31
	2.3	43,812	178	0.41

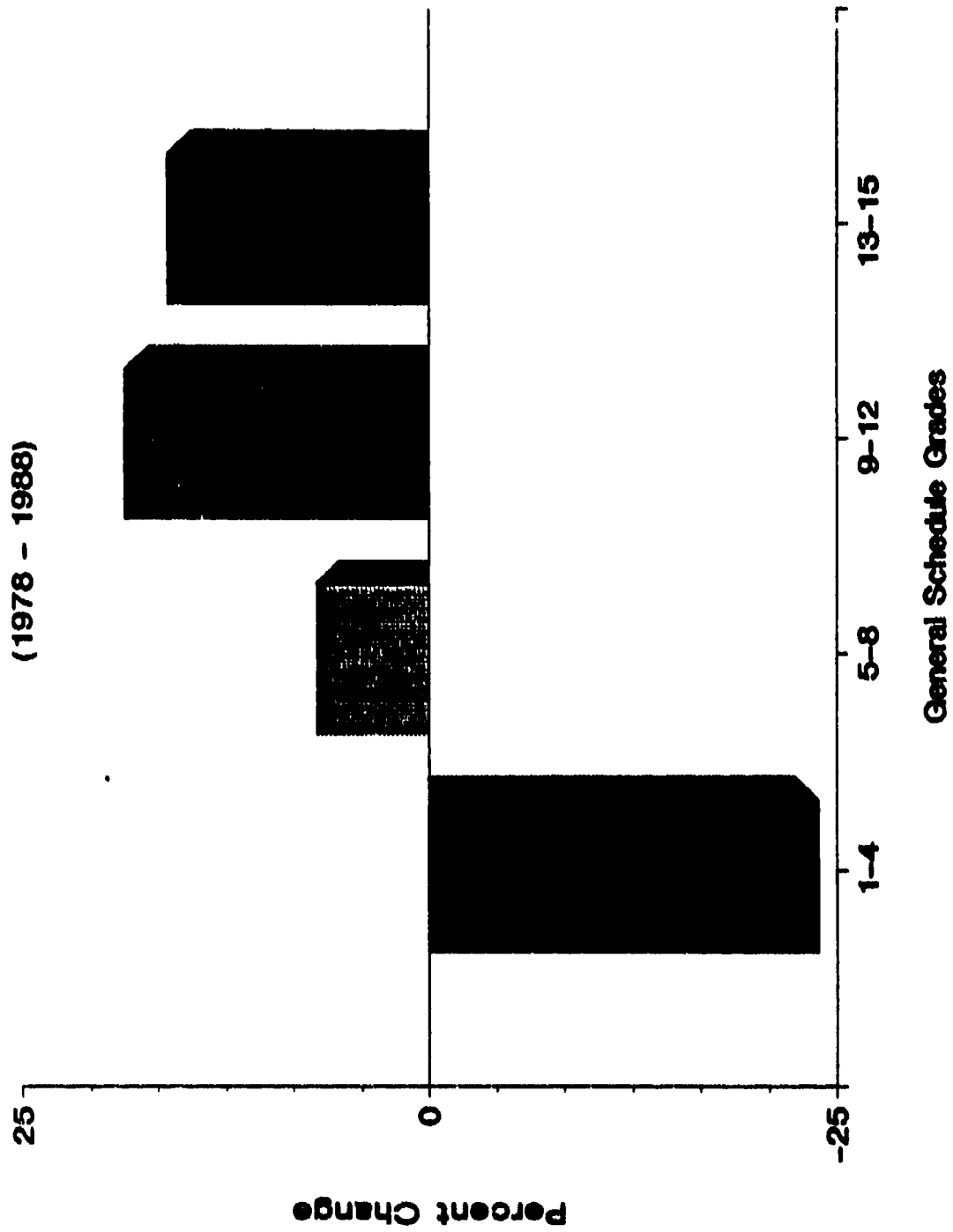
Table 1-7 (Continued)

The Math Skills Required For Federal Workers Will Rise By the Year 2000

	MEAN MATH SKILL RATING	EMPLOYED 1988	NEW JOBS 1988-2000	RATE OF GROWTH
Subtotal: CED 2.1 - 2.9		884,584	(48,844)	-5.18%
Agriculture, Forestry & Fishing	1.8	22,248	1,418	6.37%
Extractive & Related Workers	1.8	888	38	5.88
Material Moving & Vehicle Operators	1.8	33,558	188	8.32
Machine Setters, Operators & Tenders	1.8	18,871	378	2.28
Hand Working & Occupations & Assemblers	1.4	14,871	1,824	7.15
Helpers & Laborers	1.1	84,838	(2,750)	-4.24
Subtotal: CED 1.8 - 2.9		152,658	225	0.15%

*Average General Educational Development (GED) Score.
Source: U.S. Bureau of Labor Statistics; Hudson Institute.

HIGHER GRADES RESULT FROM MORE COMPLEX WORK



HIGHER GRADES RESULT FROM MORE COMPLEX WORK

- * About 60% of the increase in average grade (now 8.6) is attributable to changes in the occupational mix of the work force -- the proportion of employees in professional and administrative jobs is increasing while the proportion in clerical jobs is decreasing
- * Another 10% of the increase was caused by changing applications government-wide classification standards for occupations such as Air Traffic Control, Nurse, and Social Insurance Administration

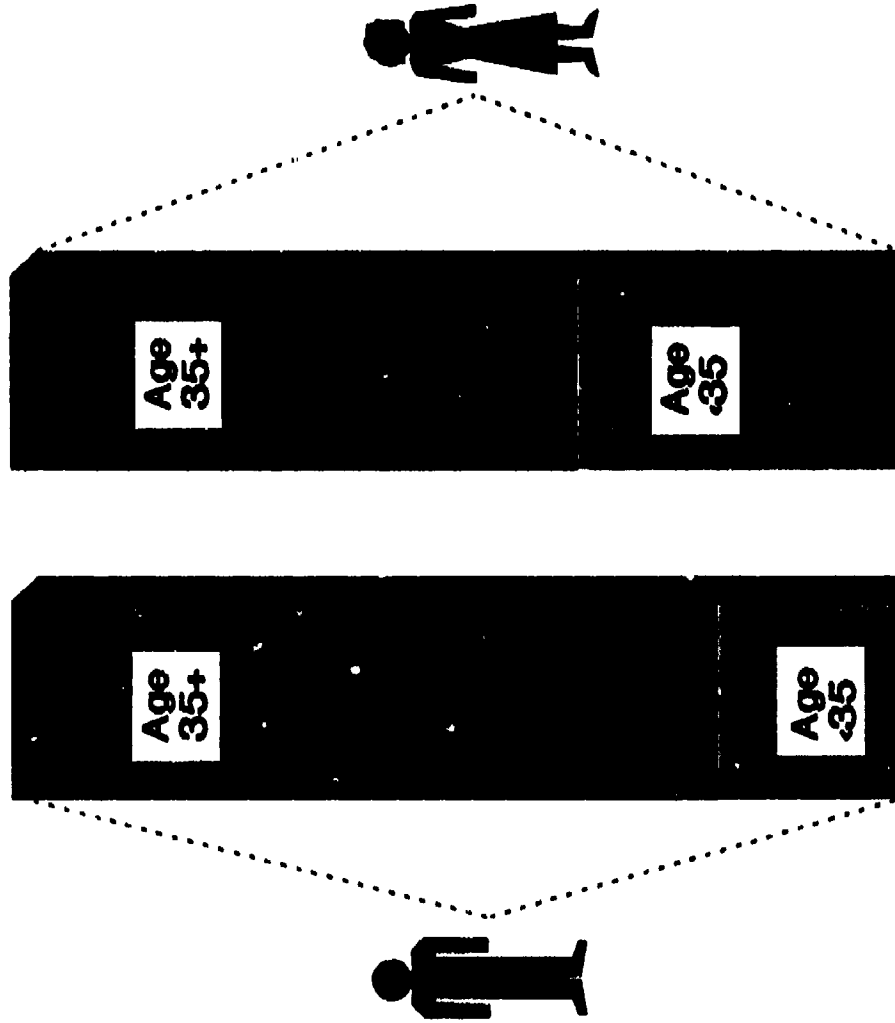
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<u>General Schedule Grade Changes</u>					<u>% of</u>
					<u>Change</u>
					1978 - 1988
<u>GS</u> <u>Grade</u>	1978		1988		
	<u>FT Perm</u> <u>Employment</u>	<u>% of</u> <u>Empl</u>	<u>FT Perm</u> <u>Employment</u>	<u>% of</u> <u>Empl</u>	
1-4	295,300	21.2	224,900	15.2	- 24 %
5-8	432,900	31.2	471,800	31.9	+ 7 %
9-12	471,900	33.9	560,700	37.9	+ 19 %
13-15	191,300	13.7	222,000	15.0	+ 16 %
Total	1,391,400	100.0	1,479,330	100.0	+ 6 %

Source: Central Personnel Data File

VR-12

**COLLEGE EDUCATED MEN OLDER --
COLLEGE EDUCATED WOMEN YOUNGER**



Full-Time Permanent Federal Employees

ONE-SIXTH OF THE WORKFORCE LEAVES EACH YEAR

- * A significant part of turnover is expiration of temporary appointments (79,000) and temporary employee quits (84,000)**
- * Overall workforce size is stable**
- * 179,000 quits, 79,000 expiration/terminations of temporary appointments, 49,000 retirements, 4,000 deaths, and 59,000 other termination, RIFs, etc. (includes 15,000 discharges)**
- * In addition there are 40,000 inter-agency transfers each year**
- * There are another 40,000 employee changes to non-pay status (suspensions, furloughs, and LWOP)**

COLLEGE EDUCATED MEN OLDER COLLEGE EDUCATED WOMEN YOUNGER

Bachelor's Degree

26% of Men are under 35
44% of Women are under 35

Post-Bachelor's Degree

11% of Men are under 35
25% of Women are under 35

Some College

20% of Men are under 35
35% of Women are under 35

Civilian Labor Force

25%

21%

Federal Workforce

40%

22%

26%

20%

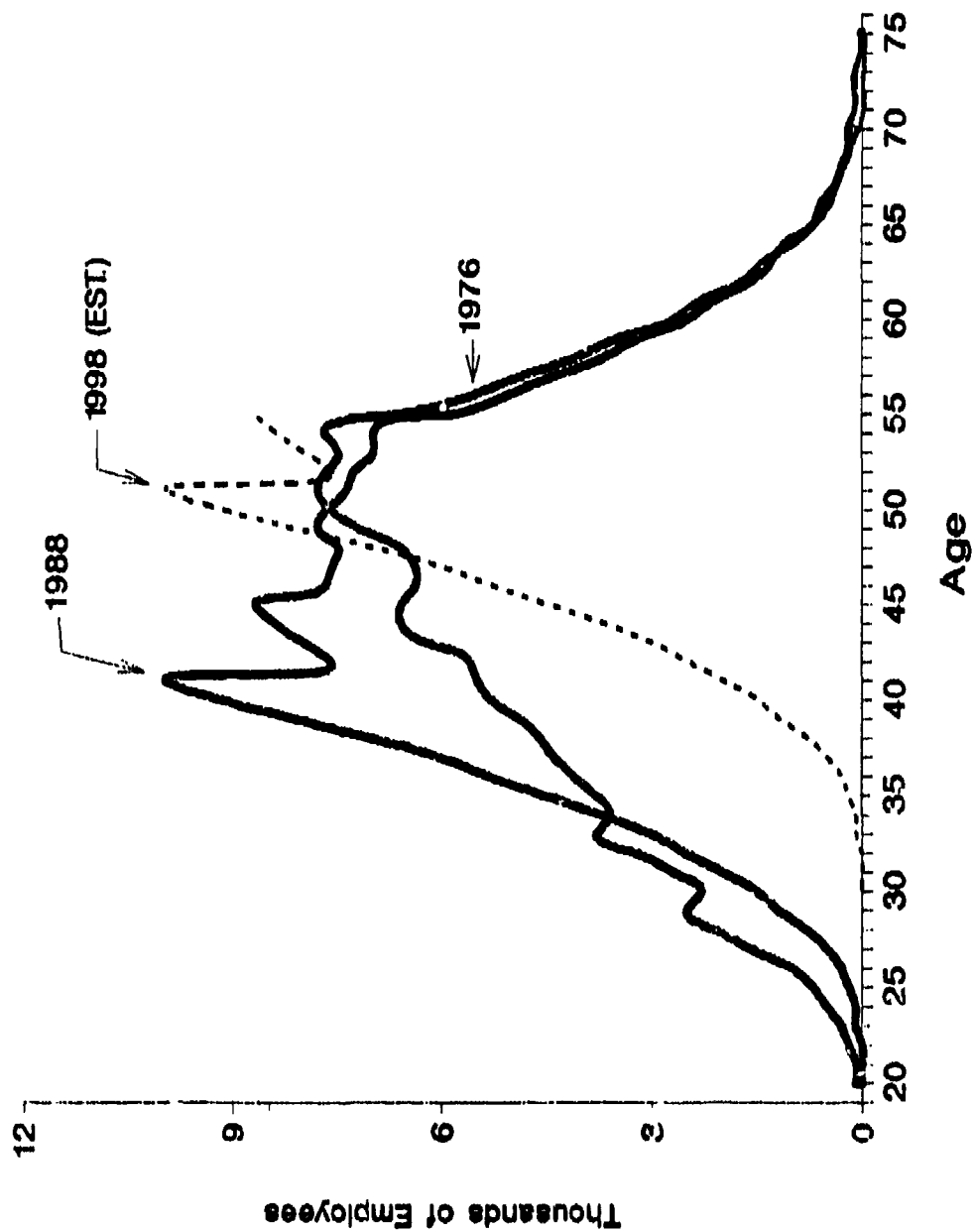
College-degree Men

College-degree Women

Under 35

Over 35

SUPERVISORS AND MANAGERS WILL AGE IN PLACE



SUPERVISORS AND MANAGERS WILL AGE IN PLACE

- * The average supervisor/manager is 46.2 years old with 19.1 years of service
- * The average supervisor/manager will work 10 more years before retirement eligibility (30 years of service at age 55)
- * From 1976 to 1988, the average age of supervisor/manager has dropped from 46.1 to 46.0 years and the median age has dropped from 47 to 46 years
- * However, the modal age (the most populous age grouping) has dropped from 51 to 41 years -- with 58% more employees in the younger grouping

FOR ADDITIONAL INFORMATION, CONTACT:

Philip A. D. Schneider, Ph.D.
Assistant Director for
Workforce Information
(202) 632-6808

John E. Curnow, Chief
Statistical Analysis and
Services Division
(202) 632-4527

U. S. Office of Personnel Management
Washington, D. C. 20415

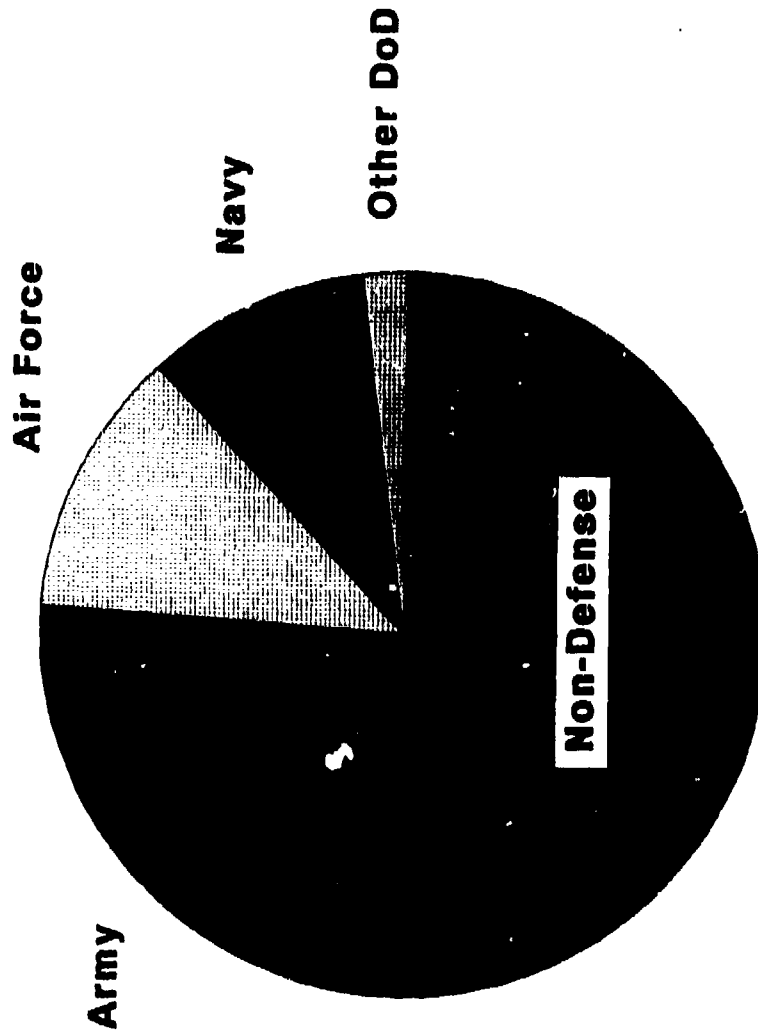
ACKNOWLEDGEMENTS

The primary source for the information in this briefing was the Central Personnel Data File (CPDF) – a large, automated information system that contains records on nearly all Federal non-Postal civilian employees. The CPDF is updated monthly by data submissions from Federal agencies; the dataflow and operating system maintenance support for CPDF is provided by OPM's Office of Information Management.

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THE COMMUNITY OF FEDERAL LIBRARIANS

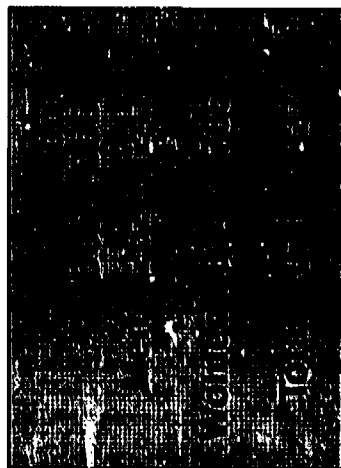
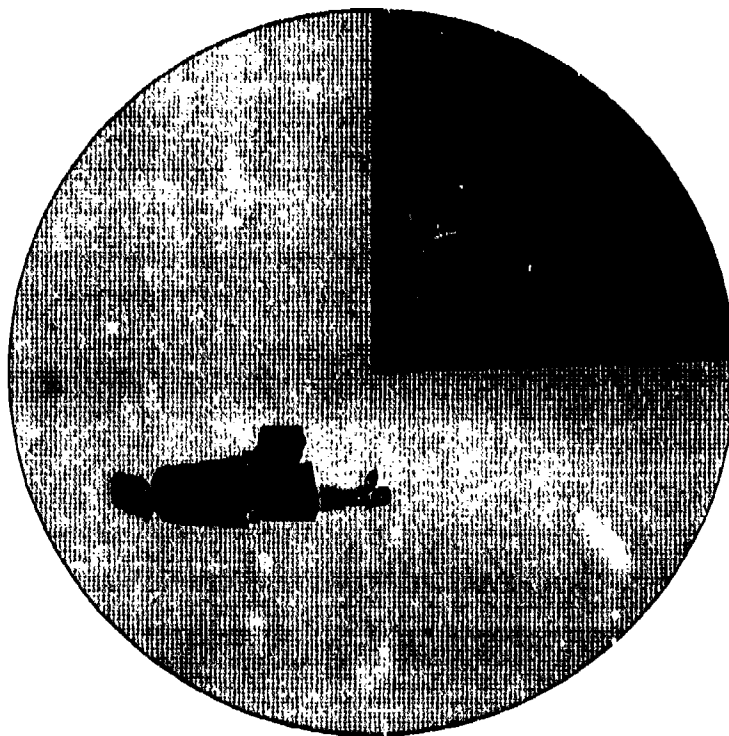
(Occupation 1410)



Source: U. S. OPM Central Personnel Data File, June 1990

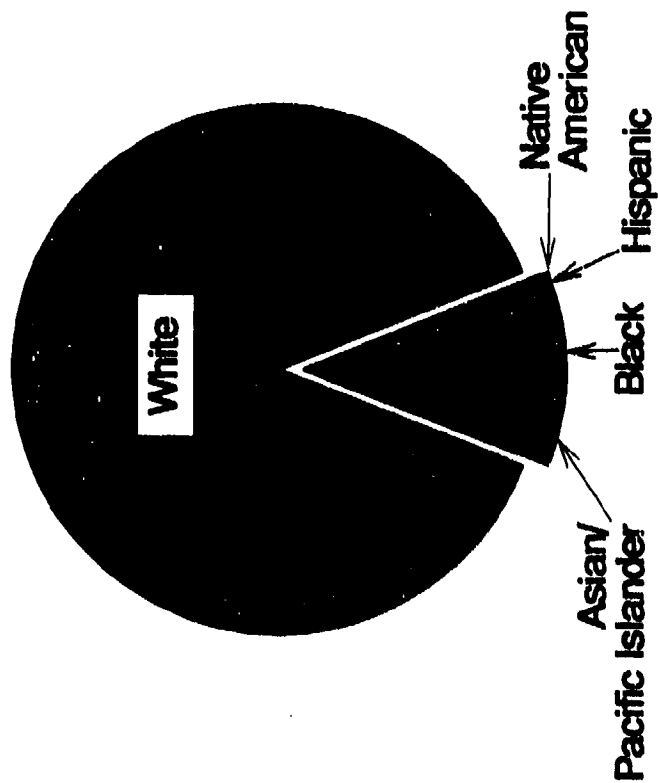
MOST DOD LIBRARIANS ARE WOMEN

(Occupation 1410)



FEW LIBRARIANS ARE MINORITIES

(Occupation 1410)

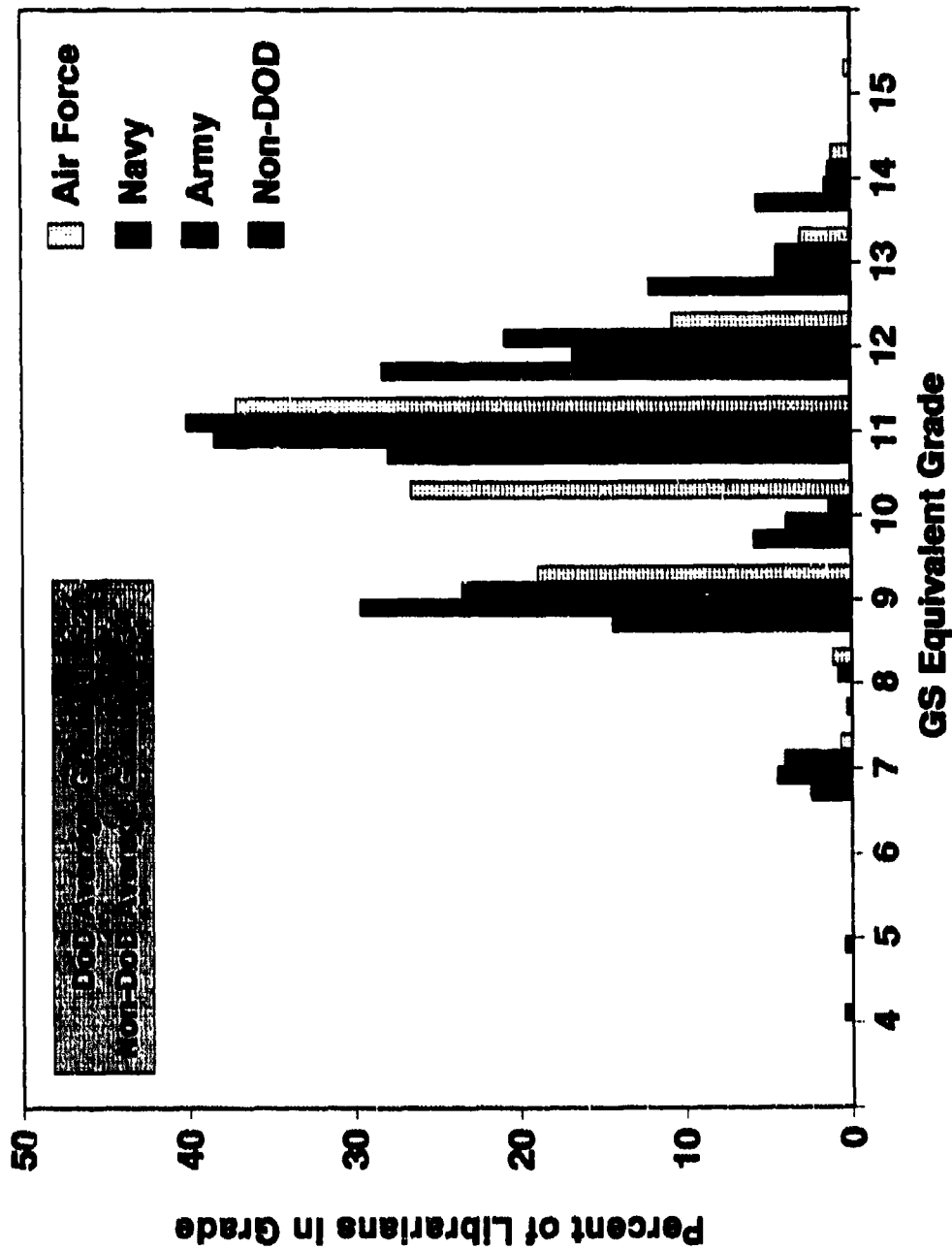


Average Grades for Librarians			
	White	Minority	Other
Grade	10.58	10.27	11.38
Grade	10.58	10.27	11.24

Source: U. S. OPM Central Personnel Data File, June 1990

LIBRARIAN GRADES DIFFER WIDELY BY AGENCY

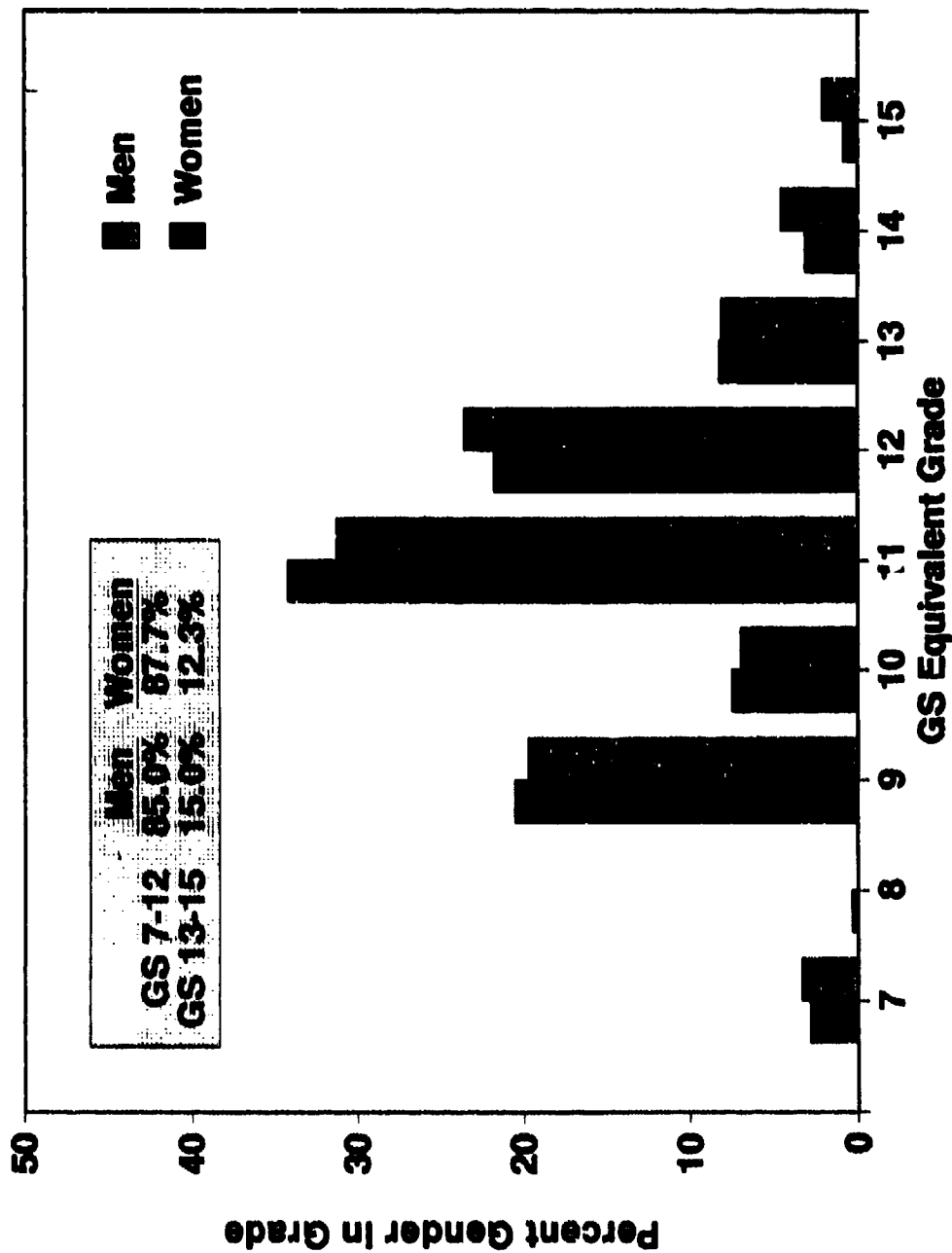
(Occupation 1410)



Source: U. S. OPM Central Personnel Data File, June 1990

GENDER GRADE DISTRIBUTIONS FOR LIBRARIANS

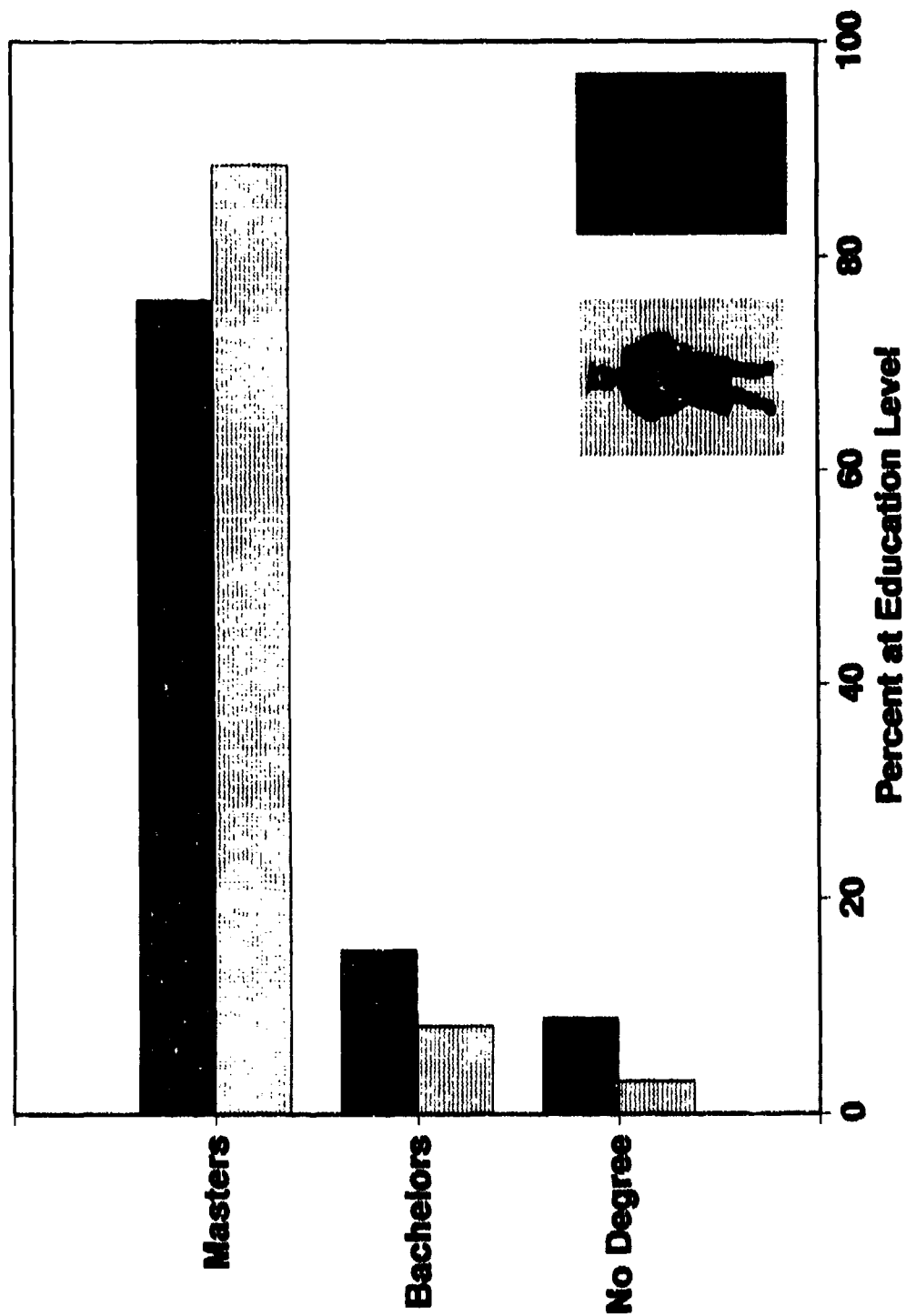
(Occupation 1410, Governmentwide)



Source: U. S. OPM Central Personnel Data File, June 1990

LIBRARIANS IN DOD ARE WELL-EDUCATED

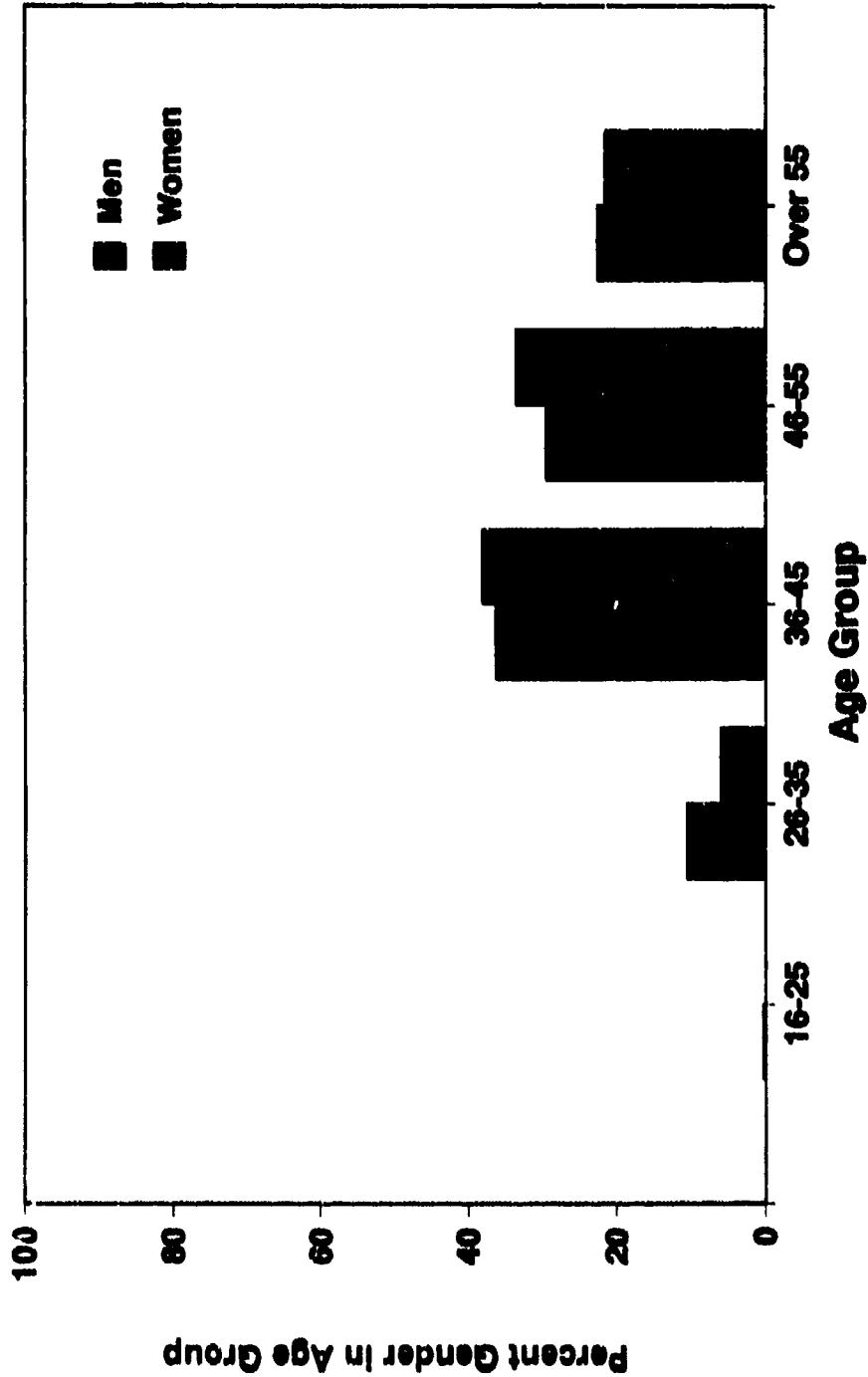
(Occupation 1410)



Source: U. S. OPM Central Personnel Data File, June 1990

LITTLE AGE DIFFERENCE BY SEX FOR DOD LIBRARIANS

(Occupation 1410)

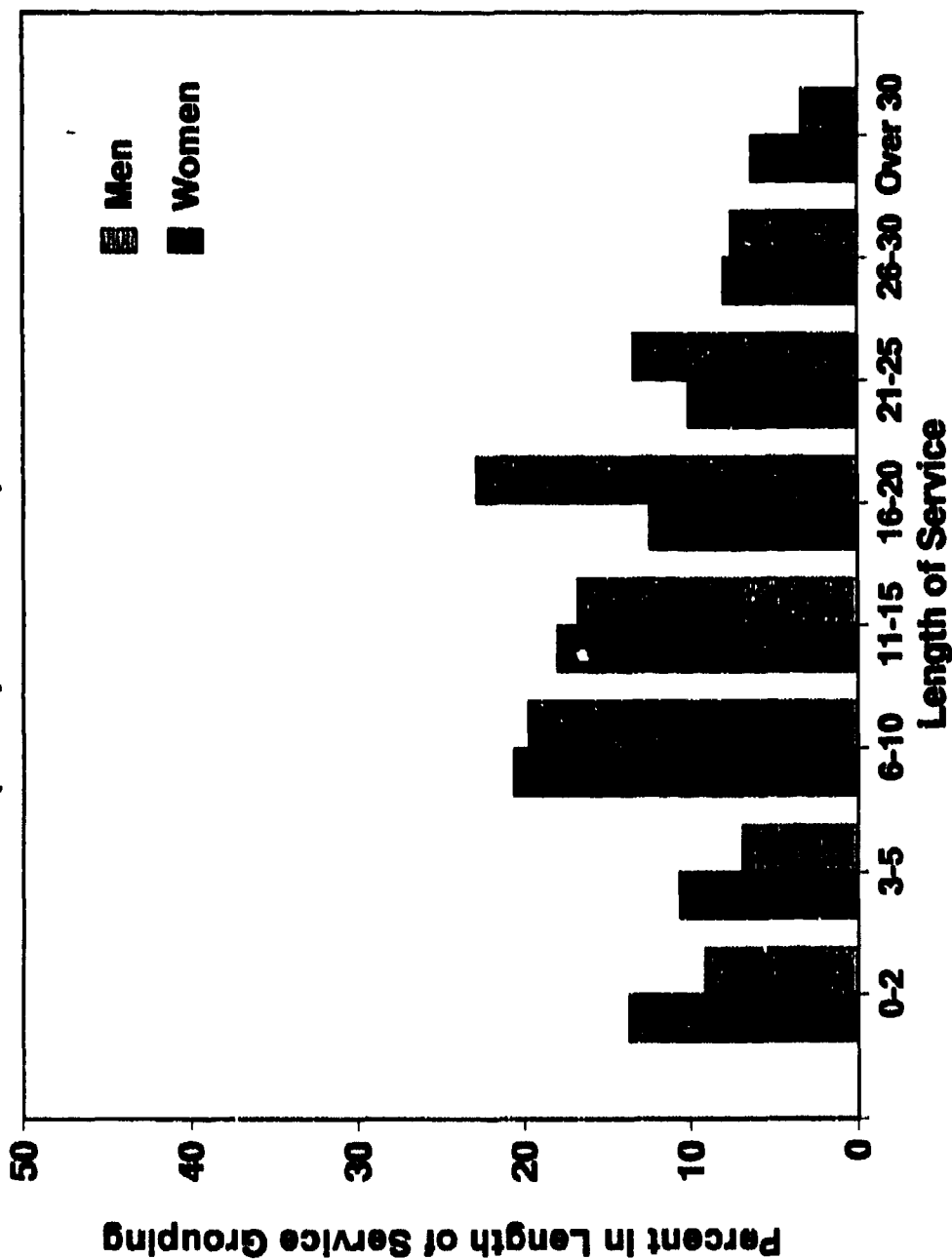


Librarian Average Age	Men	Women
Governmentwide Average Age	47.9 years	47.1 years
	42.6	38.4

Source: U. S. OPM Central Personnel Data File, June 1980

DOD LIBRARIANS' GOVT SERVICE DIFFERS BY GENDER

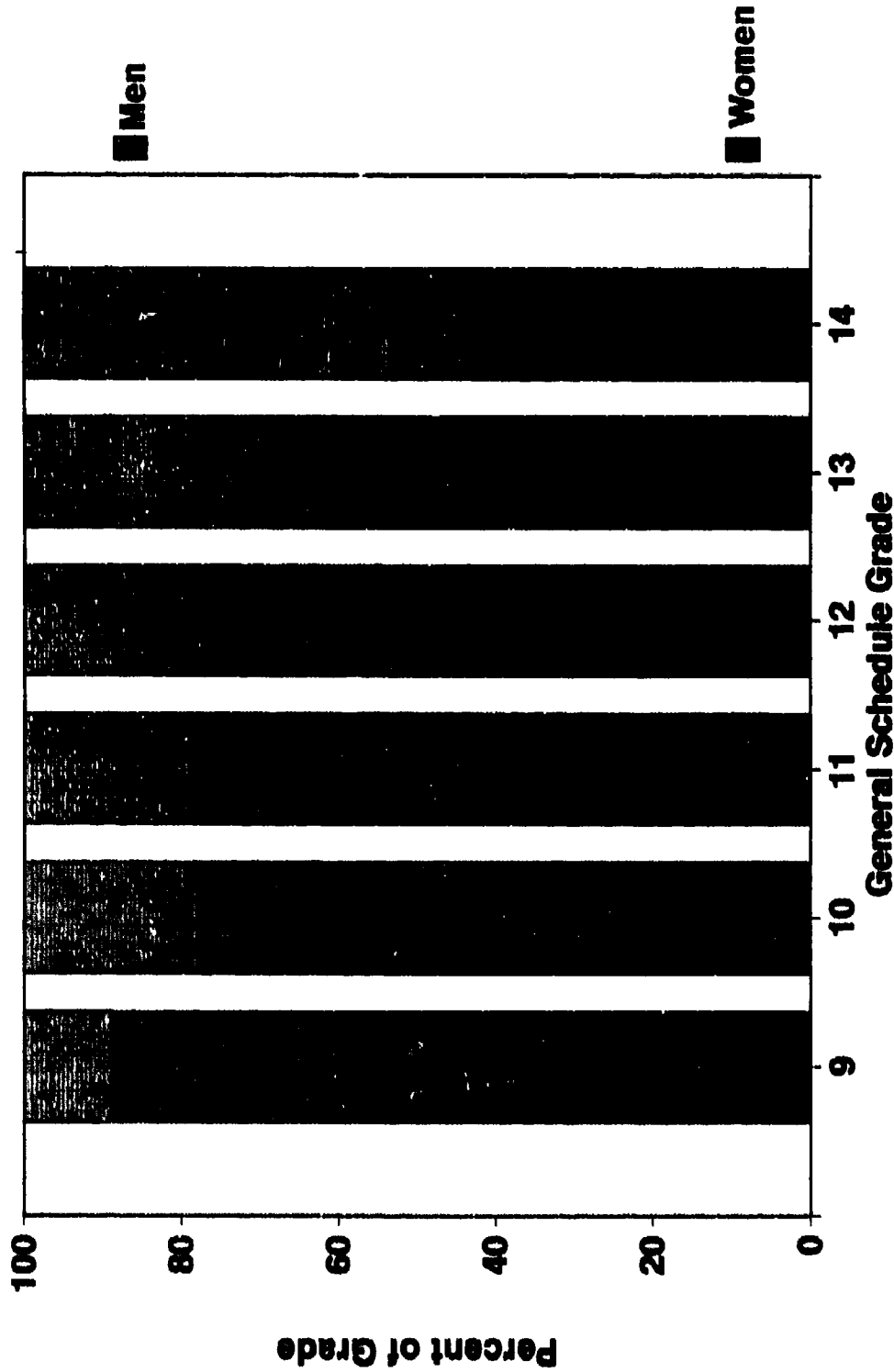
(Occupation 1410)



Source: U. S. OPM Central Personnel Data File, June 1990

MOST DOD LIBRARIAN SUPERVISORS ARE WOMEN

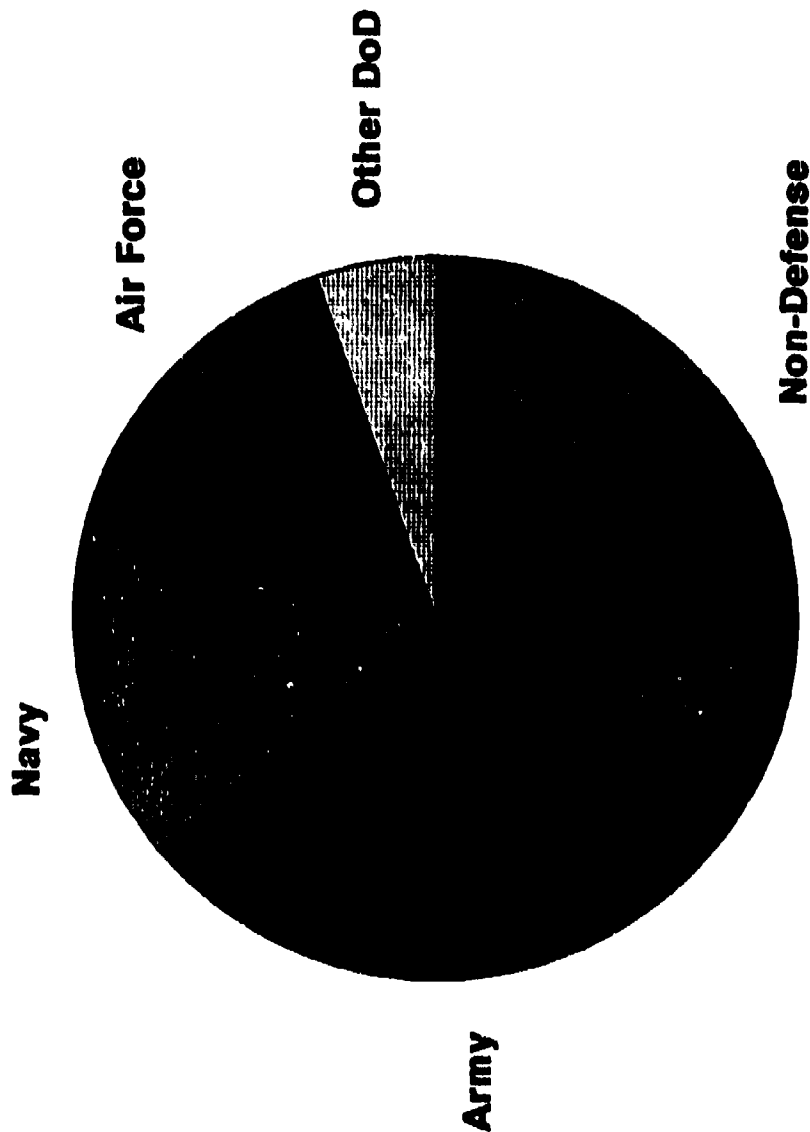
(Occupation 1410)



DOD Supervisory ratio (Librarian Supervisor/Non-Supervisor Librarians + Technicians) = 7.6

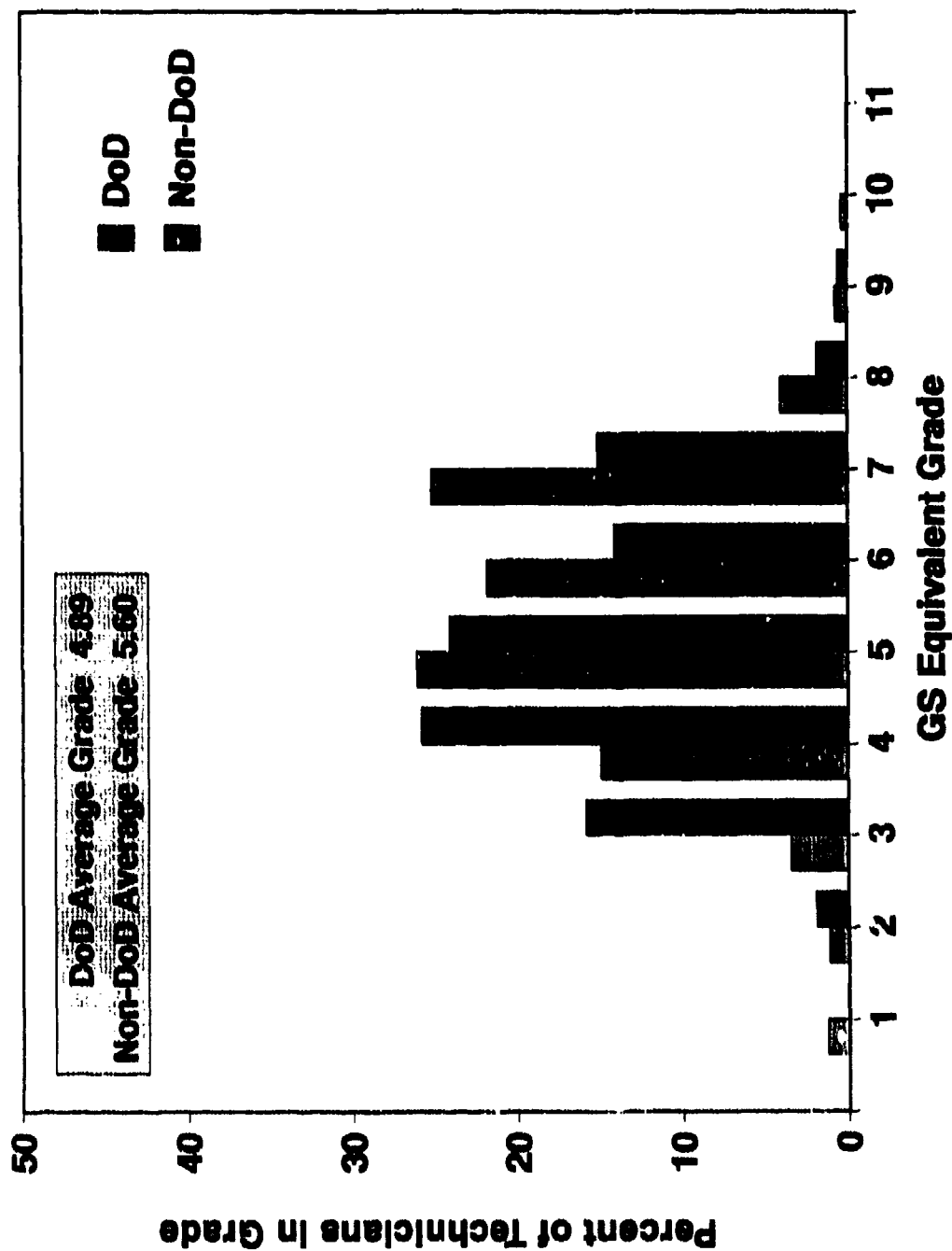
Source: U. S. OPM Central Personnel Data File, June 1990

MOST LIBRARY TECHNICIANS ARE IN DOD (Occupation 1411)



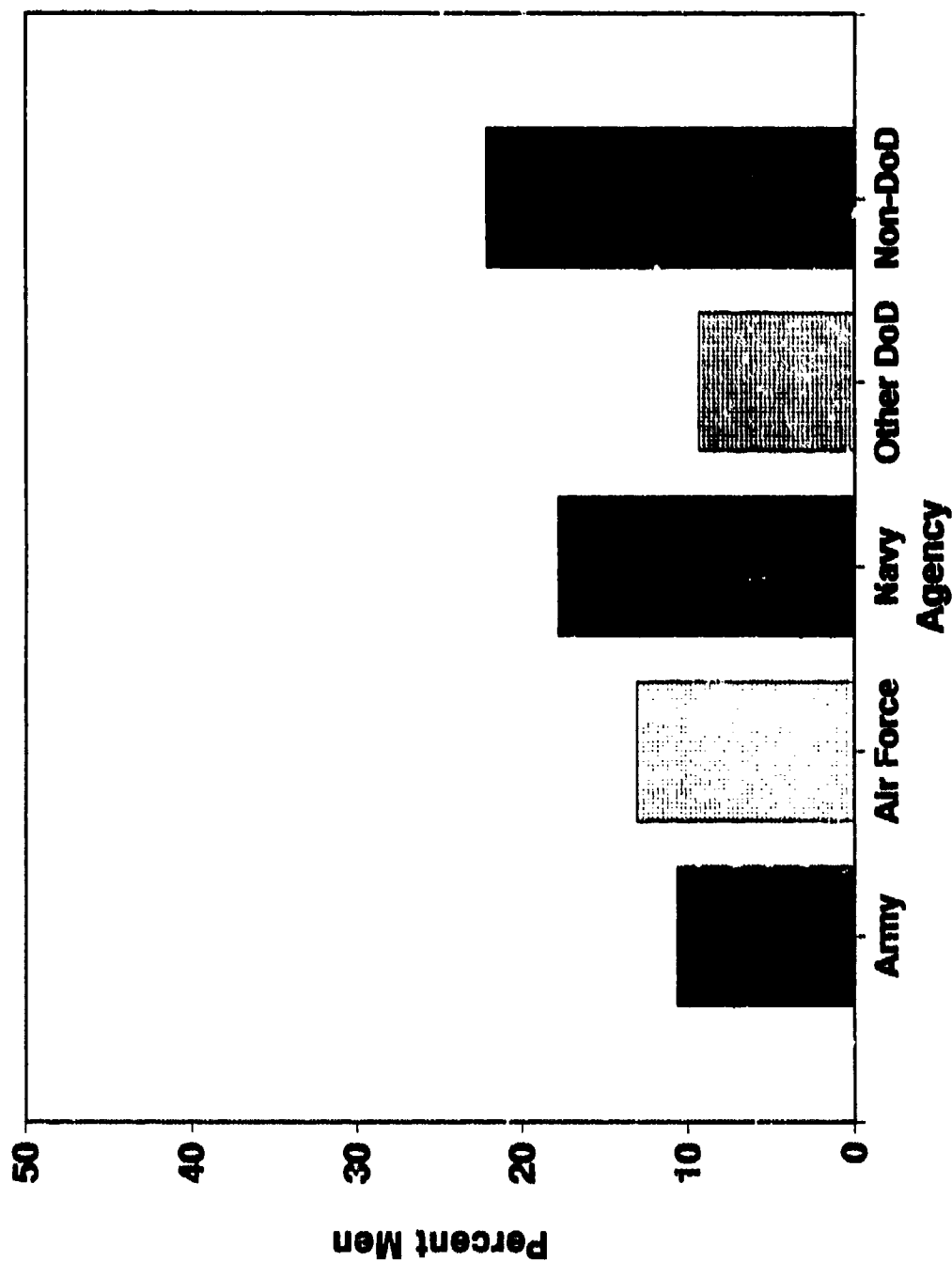
Source: U. S. OPM Central Personnel Data File, June 1990

LOWER LIBRARY TECHNICIAN GRADES IN DOD



Source: U. S. OPM Central Personnel Data File, June 1990

MEN AS LIBRARY TECHNICIANS (Occupation 1411)

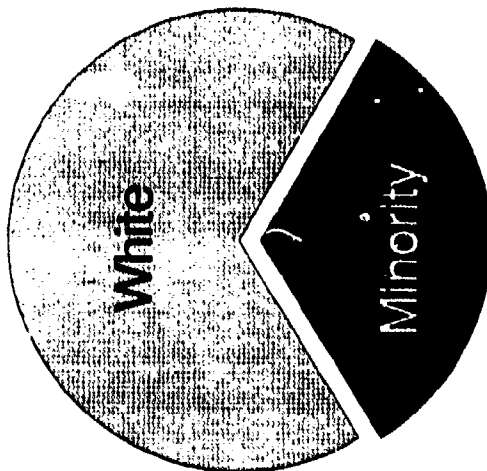


Source: U. S. OPM Central Personnel Data File, June 1990

MORE MINORITY LIBRARY TECHNICIANS OUTSIDE DOD

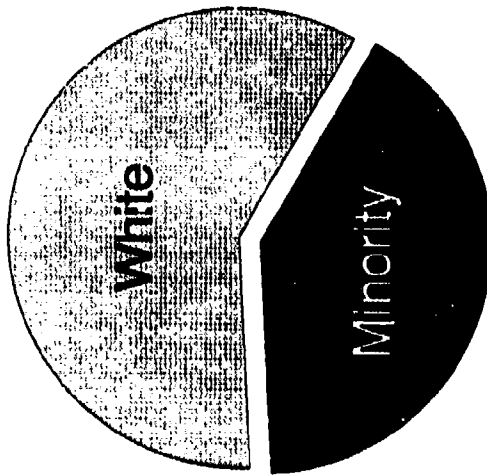
(Occupation 1411)

DoD



Average Grade: 4.89

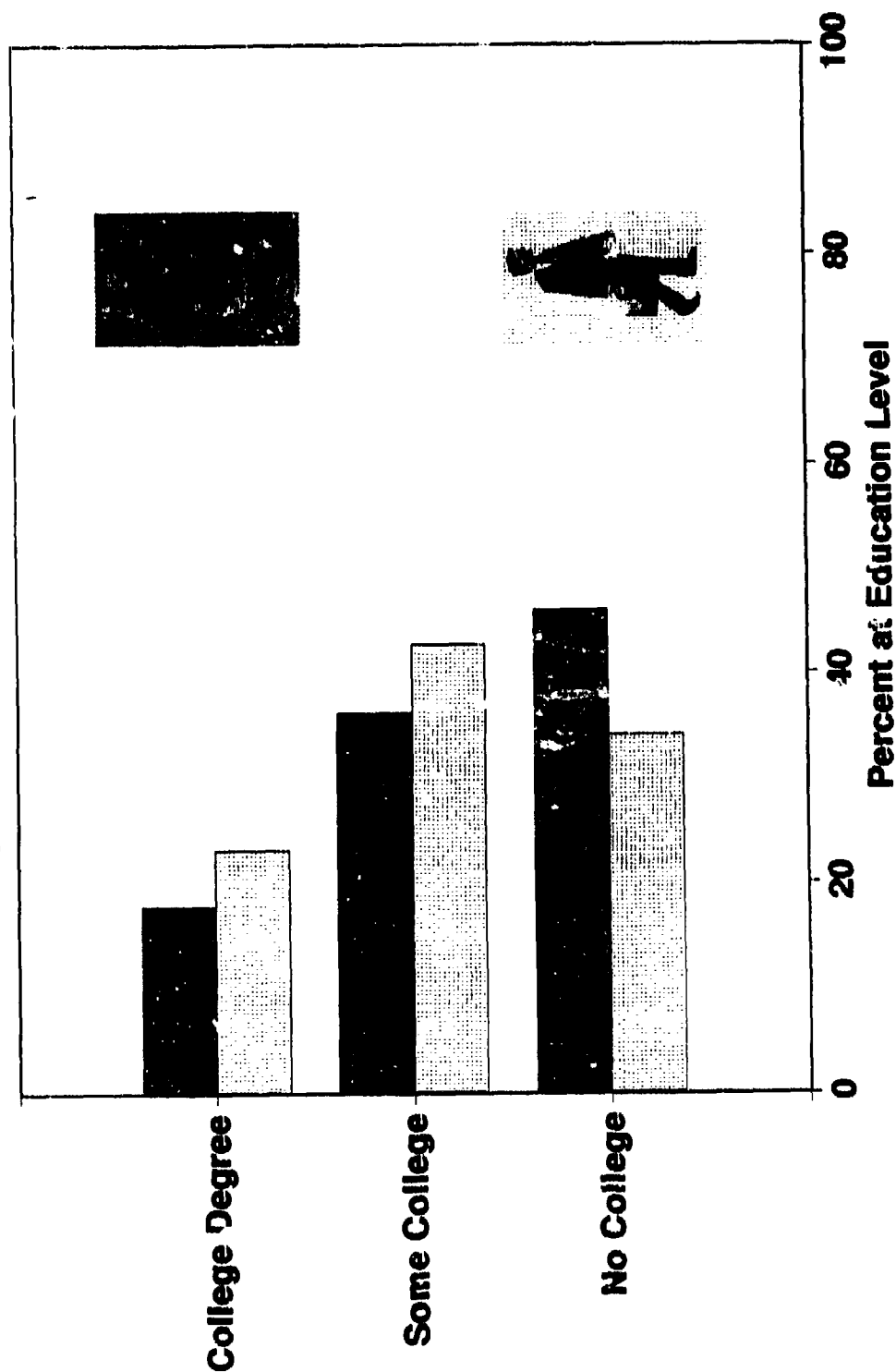
Non-DoD



Average Grade: 5.60

MORE MEN THAN WOMEN HAVE COLLEGE TRAINING

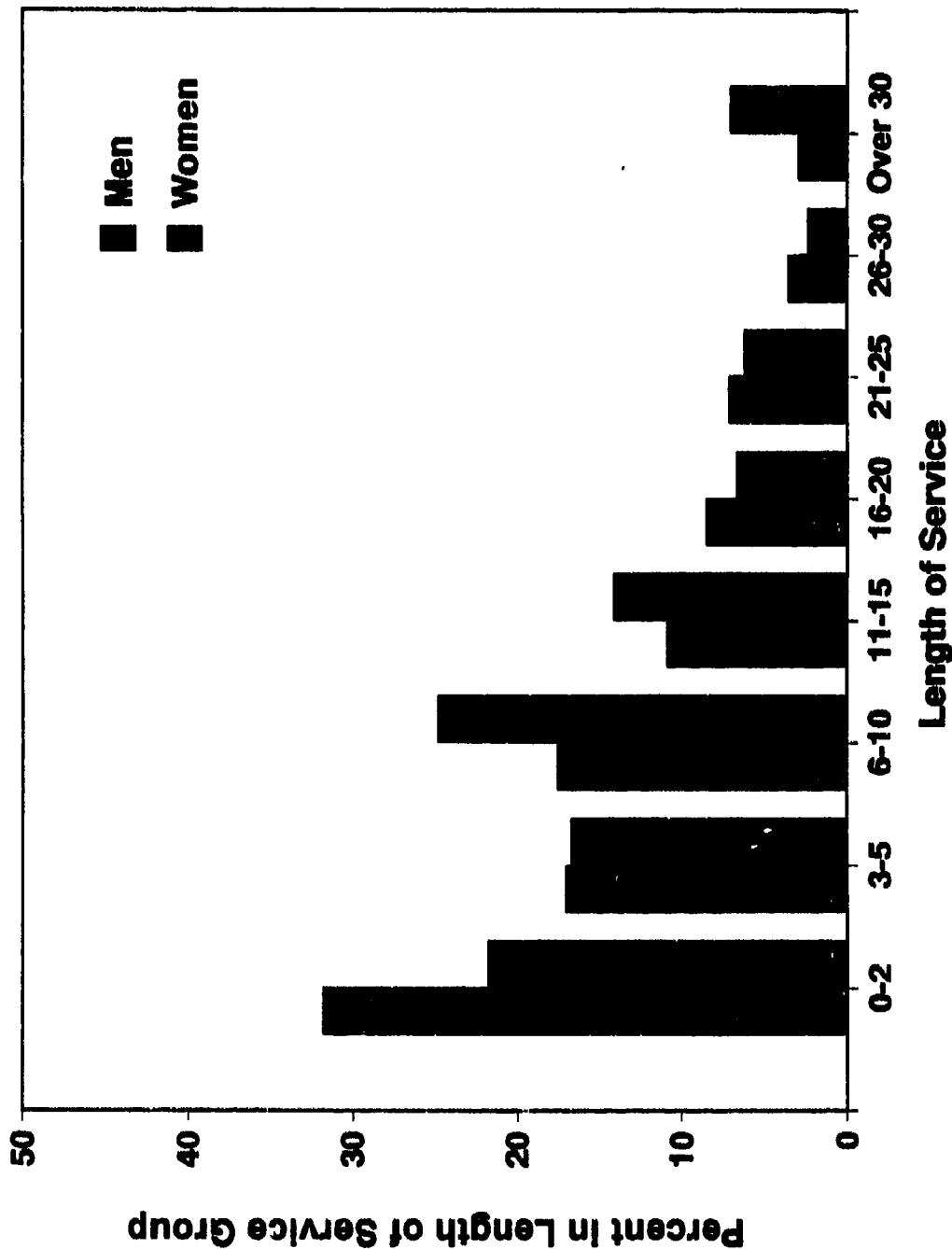
(DoD Library Technicians)



Source: U. S. OPM Central Personnel Data File, June 1990

LENGTH OF SERVICE VARIES BY GENDER

(DoD Library Technicians)



Source: U. S. OPM Central Personnel Data File, June 1990

MEETING THE NEEDS OF INFORMATION PROFESSIONALS
IN THE 90'S AND BEYOND

BY

DR. FRED W. ROPER

MEETING THE NEEDS OF INFORMATION PROFESSIONALS
IN THE 90'S AND BEYOND

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FRED W. ROPER

It is a great pleasure to be with you today and to have the opportunity to share with you some of my thoughts concerning education for library and information science students in the coming decade and on into the next century. If we have as many changes in the next decade as we had in the 1980's, how can we prepare the practitioners of the future in such a way that they can cope with the changes they will experience?

Educators today cannot anticipate all the needs of a lifetime of practice. In the entry-level master's degree program which for the most part consists of 36 semester hours, educators are hard-pressed to provide students with an introduction to the field as well as to provide them with an opportunity to begin some specialization. Library and information science education programs face a major challenge in that the master's degree program for most students represents their first exposure to any formal coursework in the area. Unlike English and math and even computer science, where graduate students are directly building on their undergraduate experiences, graduate students in library and information science are using their undergraduate experiences as an underpinning for their professional activity, but in effect they have to begin again in terms of course work.

For many students specialization may not be feasible. Studies have shown that students make many changes in career goals from the time of entering programs through taking their first jobs. A student may enter a program with a definite idea of the kind of work he or she would like to do based on pre-professional experience or on observation. Exposure to more aspects of library and information work, however, may cause the student to change direction completely.

Thus, we collectively, both educators and practitioners, need to be concerned about entry-level professional education and also the lifelong learning and development needs which follow the basic degree. This is the basic challenge facing us as we seek creative and innovative ways of preparing librarians to assume their starting roles and helping them to continue their professional development.

The number of programs of library and information science education accredited by the American Library Association has declined in the past 10 years: from 68 in 1980 to 59 in 1990. Of the 68 1980 programs, 11 have closed, 1 is in the process of closing, and 1 lost accreditation. Of the 59 1990 programs, 56 continue and 3 new programs have been accredited since 1980. Six of the programs have the same dean in 1990 as in 1980, but that number will change in January as Brooke Sheldon becomes the new dean at the University of Texas at Austin.

Over the past ten years the percentages of part-time and full-time enrollments have remained fairly constant: 58% part-time and 42% full-time in 1980 as compared with 60% and 40% in 1990. Although the total number of programs has decreased, the total number of fulltime and part-time students has increased by about 700: from 8770 enrollments in master's programs in 1980 to 9469 enrollments in 1989/90. We have always had a high percentage of part-time students, and careful attention needs to continue to be given to their needs.

In recent years some of our most prestigious library schools have been closed. No fewer than 11 institutions have closed their programs of library and information science education. Nine of the 11 are private institutions, and they include Case Western Reserve University, Denver, Emory, Peabody/Vanderbilt, Southern California, and most recently Chicago and Columbia. In June Columbia was given 2 years to close its doors.

What does this mean for the profession? Is it a trend? Trend or not, it certainly has implications for all programs. I do, however, tend to agree with Michael Koenig, dean at Rosary, who states in the September, 1990, American Libraries that he believes that the closings are the result of particular problems at particular institutions. He goes on to point out that there is a real danger that the perception of a trend could become the reality.

The coverage of the Columbia closing in the Chronicle of Higher Education has heightened awareness of the problem among administrators in general. I have had a number of comments from my fellow deans and administrators on campus asking what happened.

There is no simple answer to why any of the programs closed. In most instances there is a combination of factors ranging from poor enrollment to finances to local campus politics to a lack of linkage to other units within the institution. It's my personal view that the latter is the most serious problem--and the one the program can do something about. Whatever the reasons, these closings should carry a

lesson to all of us: we must weave ourselves into the academic and research life of the larger institution.

During the '80s several schools were combined with other units in the institution to create larger divisions. Four programs are currently in such a structure. They may include departments of public policy, communications, journalism, computer science, among others. In at least 1 instance, the dean of the former library education program is dean of the expanded school. There continue to be several other programs which exist as departments in schools of education.

Some time ago, an editorial by John Berry, entitled "Educating the 'Information Society,'" appeared in Library Journal. Mr. Berry's underlying concern, although not stated as such, is that library educators may be guilty of throwing out the baby with the bath water in their zeal "to dump their old curricula to launch new programs designed to meet what one school's committee called, 'a need for a radically reformed educational program to provide the professional expertise necessary for the successful transition to the information society.'" As we talk about the needs of information professionals in the future, we must maintain a healthy respect for the traditions and foundations upon which successful library science programs have been built, while focusing on changed and expanded goals and objectives in today's information age.

Technology by itself is not going to lead us into the 21st century. Rather we have to prepare our students and our graduates for the changing roles that will come about through opportunities and challenges presented to libraries by advances in such areas as information transfer and retrieval, personal computing, and telecommunications.

Not only do we need to give our students the kinds of background needed to use technology effectively, but we must also participate in the redirection and retooling of librarians at higher levels who have not had the opportunity or have not chosen to take the opportunity to become computer literate. I should also point out that providing our students with the kind of exposure to technology that is needed for traditional library jobs, much less for positions within the broader information industry, places a severe strain on library school budgets. (ALISE data)

The goal of library schools should be a solid curriculum that produces a body of competent individuals capable of functioning in a variety of operational environments; a curriculum that lends itself to adaptation and change as necessary but which does not become faddish or trendy; a

curriculum that assures our graduates that they have the preparation needed to sustain them in a constantly changing work arena.

Some schools have faced these challenges from a virtually "cosmetic" view--simply by adding information science in some incarnation to the name of the school without truly reviewing curricular needs. Just changing the name of the school won't meet the needs of the students in the job market. Careful curricular review and implementation of the findings, however, will be a giant step forward.

As John Berry points out in the editorial I mentioned earlier, the first generation of the "information society" is now coming through our elementary and secondary schools--a generation which will be the first to have cut their teeth on computers. Members of this generation will be the primary library users of the next decade, and we must turn out librarians who can serve their information needs effectively.

As a result of all that has been written about the information society, the information explosion, the information revolution, and other aspects of the information age, we acknowledge as a given that information is a critical resource, and further, that better management of information in the future will be imperative because of its proliferation and the complexity and diversity of the tools for handling it.

Numerous studies point to the increase in the various types of information careers and to a decline in the role of the librarian in the overall information industry. Michael Cooper's work on the structure and future of the information economy, for example, leads him to conclude that "we cannot expect the demand for the services of librarians to increase simply because we have entered an information age." His construct of an information economy has many meanings with a limited portion pertaining to traditional library activities.

The obvious implication is that the information handlers of the future will be educated in schools of library and information science, in business schools, in departments of computer and information science, in some combination of these, or in some other as yet undefined manner. Our concern is the future role of library schools in meeting the educational needs of a variety of information professionals at several levels--with the distinct likelihood of being in competition with other campus units.

To compound the problem of competition for students, often we seem to be in conflict with employers who feel that the most

emphasis needs to be put on skills acquisition. Employers charge educators with not being up to date with what is going on in the practice of library and information science, and educators view employers as having too narrow a view of the educator's role.

As critical as it is that our graduates have entry-level competence in the technical aspects of information work, it is equally as important that they have the opportunity to develop higher-order skills: management ability, motivational ability, supervisory skills, and the ability to think critically and analytically. Libraries as institutions are obviously undergoing considerable change, and our graduates need as much as anything else to be able to recognize where change is needed and to participate as change agents in these processes.

The period when our students are with us is too brief to teach everything a potential employer or a faculty member thinks is important. Choices have to be made--by the school as to what can and will be offered and by the students as to what he or she can most profitably spend time on.

Another concern, and a fact of life in library and information science education, is the area of enrollments. Usually the library program is one of the smallest units on a campus, and often it may be one of the least well-known.

Marketing our programs and our students will be a substantial challenge in the years to come. Librarians often suffer from an image problem and from a lack of understanding on the part of the public about our work and its potential benefits to users. We are perceived primarily as collection developers, which is a perfectly legitimate part of the perception, but which is only the tip of the iceberg. Our service orientation is too often underutilized or simply not readily apparent.

Probably we are guilty too often of preaching our cause to the true believers rather than aggressively marketing our potential where it has the possibility of doing the most good. Special librarians have had a long and proud history of analysis and synthesis of information. Other types of libraries, however, have not been so aggressive in marketing services, but for these types to survive a change in the types of services offered may be called for. The challenge to library schools is to provide our students with the skills to carry out effective marketing programs both to actual and potential users.

Utilization of technology in delivery of educational experiences as well as the traditional efforts we have all been used to will be of major importance in the coming years.

Already efforts are underway in library and information science education to make courses more accessible.

In order to illustrate how technology can be and is being utilized in the delivery of graduate education, I'd like to share with you the distance education experiences of the University of South Carolina's College of Library and Information Science, and to tell you about the formation of a national consortium for delivery of library and information science education. Since 1976, our College has been actively involved in a distance education program utilizing both television delivery of courses and off-campus offerings at selected sites around the state. By and large, our efforts are primarily directed toward graduate degree-seeking students.

In order to understand the characteristics of this particular program of distance education, it is necessary to understand the institutional environment in which the program takes place. The University of South Carolina consists of nine campuses: five 2-year campuses, three 4-year campuses, and the flagship campus in Columbia. The Columbia campus is the home of all graduate programs sponsored by the University, including our College which began instruction in 1972. The College offers the only American Library Association accredited master's degree program in South Carolina plus a specialist degree. We have about 300 students in our two programs.

Distance education at USC is greatly facilitated and encouraged by the central administration. All forms are administered by one unit within the University: the office of the Chancellor for University Campuses and Continuing Education. Without the support services of that office, the College would have encountered serious difficulties in mounting its program. We are greatly indebted to them and to the University's commitment to providing graduate educational programs outside Columbia.

Graduate distance education at USC can potentially take three forms: Traditional off-campus teaching, 2-way live interactive television, and open broadcast non-interactive television. The College is presently participating in all 3 types of offerings.

Off-campus teaching involves travel to another location to offer a regular College course, and we have been doing this since 1976. At USC there are 2 major factors which facilitate the offering of off-campus courses. First, the Chancellor's office operates a program called Graduate Regional studies. Each of the non-Columbia campuses has a resident director of graduate regional studies. This individual works with the

College in assessing need and demand for a course and then makes local arrangements for the registration of students and arranges classroom space. Another factor is geography. Columbia is located in the center of the state with no site being more than 2-1/2 hours away. The College normally offers 2 or 3 off-campus courses each semester.

The second distance education option available at USC is graduate level courses through live interactive closed-circuit television. This method uses satellite and telephone lines to broadcast live classroom instruction from the Columbia campus to approximately 20 locations throughout South Carolina. As the students are viewing the course, they have the capability of talking with the instructor to make a comment or ask a question by using a telephone at the site that is instantly connected to the studio. Both question and answer are heard at each site in the system. On at least three occasions during the semester all the students in the course are required to meet in Columbia for in-person instruction and testing.

A variation of this method involves a combination of pre-taping for use with the live telecast. In this manner, material that doesn't change very much, such as some units in the research methods course, can be taped and used more than once, either by the same instructor or by another instructor. Case in point: our former Assistant Dean is now the Associate Provost of the University. We continue as his faculty home, and he taught our research methods class on TV this summer. In order to accommodate his schedule, we decided that he would not do a full live course. In the spring semester he completed taping of certain portions of the course. These portions were broadcast at the time of the class for a portion of the time, and John appeared live for the rest of the session. The opportunity for interaction was there, but the delivery was not in what we at USC have come to consider our traditional mode of delivering a TV course. And the beauty of it is that the recorded portions which have been carefully chosen can be used by John again or by another instructor.

A variation of this is the taping of our former technical services instructor presenting certain components of our basic technical services course for another instructor to use in a live class this semester. In that instance, the second instructor becomes the facilitator, answerer of questions, initiator of assignments, grader, etc.

Two support centers at USC facilitate our delivery of courses through TV: the Instructional Services Center and the Office of Telecommunications Instruction. ISC provides the technical expertise including studios and the full range of

production and consultation services needed for telecommunications delivery. The Office of Telecommunications Instructions promotes the courses and provides logistical support, including registration, mailing of textbooks and syllabi, photoduplication, and toll-telephone access to faculty by students. In addition, that office provides faculty with counseling in instructional design and media utilization.

The University has had many years of experience using this format. The Colleges of Business Administration and Engineering entered this arena in the late 1960's. In addition to those colleges, the Colleges of Health, Social Work, Education, and Nursing, along with our College, are the primary users of the closed-circuit TV system which has some 6,000 enrollments per year. Our College accounts for about 1/3 of these enrollments. As you might expect, there is considerable competition among the colleges for airtime, and this is increasing. Because we ultimately are transmitted through the ETV station in South Carolina, we also face competition from other institutions, most notably Clemson University.

The third component of the distance education program at USC is the use of open-circuit TV which involves the general broadcast of taped instruction to all parts of South Carolina via educational TV. That is, the student can take the course while sitting at home. In this time of general availability of VCR's, students may tape segments which are aired at inconvenient times for their schedules. Alternatively, the Office of Telecommunications Instruction can provide the student with all tapes for the course for use at his or her convenience. These students are also required to come to Columbia for three sessions of in-person instruction or testing.

To date the College has used this format primarily for courses aimed at non-major undergraduates or persons seeking re-certification credit. One course has been developed in the college specifically for this mode: Jump Over the Moon: Sharing Literature With Children. We are seeking funding for others.

In the spring of 1982, the College first offered Jump Over the Moon, using open-circuit television. In the fall of 1982, the College offered the course in Foundations of Information Sources and Services, using interactive television. These were the first courses in what has since become a regular, indeed the major, part of the College's response to the distant learner in South Carolina.

The decisions to enter the arena of TV delivery of courses were not made lightly and without some cost to the faculty. It

should be noted, however, that the College was founded on the basis of innovation in education and has enjoyed a generally open-minded and risk-taking faculty. Thus the notions of trying something which seemed at that point to that faculty fairly radical was not a great issue. The major concern of the faculty was the same as for any new course or other innovation--making sure that the intellectual and academic integrity be maintained.

The TV courses have been carefully monitored, and studies have been conducted to determine their effectiveness. The bottom line is that comparisons of TV courses and students involved in them with the same courses offered on campus have shown no statistically significant differences among the variables selected for study.

Every course offered via telecommunications is treated the same as courses taught in the traditional classroom--the same syllabi, assignments, grading procedures, requirements, and end-of-term evaluations are used with each course. Students are also required to come to Columbia for three intensive, live Saturday sessions.

Both required and elective courses have been offered using interactive television, including: basic reference, research methods, selection of non-media, administration, collection development, introduction to bibliographic control, adult materials, and records management. We are now looking into the feasibility of offering certain courses at a limited number of the sites that would have the appropriate resources for the courses, i.e., computer courses and specialized resource courses, such as health sciences literature, which I will be offering next spring.

By 1986, when I became Dean, the College had a wide-ranging distance education program that had become an integral part of the College's activities. What seemed to be needed, however, was a policy on how these efforts would be carried out. A Distance Education Task Force was appointed early in 1987 and its report reaffirmed the College's commitment to distance education and put into place a policy that involved all of the faculty in distance education. Beginning with the 1988 academic year, we published a five-year plan of courses we intend to offer in Columbia, or to take to other sites, or to broadcast over TV. This schedule is intended to provide our students with the information they need to plan for their own academic programs, recognizing that changes have to be made, as faculty and College needs change.

Implicit in the development of the five year plan were the following:

- (1) participation of all faculty;
- (2) all distance education courses would be taught within load;
- (3) each faculty member would offer one course per academic year in the distance education program and the remainder of his/her courses on campus, with TV and off-campus assignments alternating.

The distance education program is not without problems and frustrations to faculty and students alike:

- (1) Not all courses lend themselves to delivery away from campus--either by TV or on-site offering; some can be offered only at selected sites which have needed facilities. For example, computer courses need access to adequate laboratory facilities.
- (2) Taking a course off-campus usually involves the loss of a full day by faculty who must travel to a remote site, conduct class, have local office hours, and return to Columbia.
- (3) Enrollments in the TV courses have reached large numbers, and extra assistance must be provided to faculty. In the spring semester of 1988, I offered the same course that was the College's initial entry into closed-circuit interactive TV and had 156 students at 20 sites in the state. Yes, the Dean participates in this program, too. How could I expect the faculty to continue a commitment to an activity that I didn't participate in? That participation has given me a greater understanding of the problems, frustrations, joys, and satisfaction that our faculty experience in TV teaching.
- (4) Students still have to visit Columbia or other centers of population for resources not available elsewhere. We take the class, not the course, to them.
- (5) Advising has become more cumbersome. In 1988 we implemented a regional advisory system in which the faculty go to sites for a day of advisement each semester. All faculty participate, and the entire state is covered. Guess who got Hilton Head!

On the positive side, the College's overall enrollment has increased dramatically -- both in and off campus. Since the first TV courses were offered in 1982, the number of credit hours generated by the College has increased 133%. At the same time that we have seen a dramatic increase in off-campus credit hours, there has been a significant increase in full-time students on the Columbia campus.

What of the future? We intend to look for ways of making our program more effective. Providing more development

assistance to faculty in course preparation and graduate assistance to execute the course will strengthen our offerings. Refining and reviewing our five year schedule will be an ongoing activity. Providing more on-site assistance to TV students in the form of facilitators or discussion leaders at each site is under study. Review of all our courses to determine which courses completely or in part lend themselves to TV production is imperative. Seeking new ways of providing courses at a distance is underway. One possibility is the use of audio with computers to cover areas that don't necessarily need video. Creative packaging of parts of courses using less interactive closed-circuit TV time may help in our quest for more TV time in order to mount more courses.

What do I see as being the primary factors in the success our College has enjoyed in its distance education program? First and foremost is commitment -- from the top down, and commitment is alive and well at USC! A second factor is evidence that the integrity of the program is being maintained regardless of the medium of instruction. This has been affirmed by our various accrediting agencies, including ALA and the state's Commission on Higher Education. Third is support and cooperation from all units. The undergirding of all this, of course, is adequate resources. But no matter how wonderful your resources and facilities, the program won't be a success unless everyone is convinced that this is the right route to follow. As you would expect some of our faculty are more enthusiastic than others. They all, however, support the program, recognize the benefits it has provided the College, and see this program as being a major contributor to carrying out the College's mission. This has had an interesting effect on our recruitment of new faculty, and we spend considerable time with candidates making certain that they are comfortable with our mode of operation.

For about a year and a half, a group of library schools has been talking about nation-wide cooperative distance education efforts in library and information science. We are working with Jones Intercable Co. of Colorado. The instigators or co-conspirators in this initial effort were Clarion State, Emporia State, South Florida, and South Carolina.

All library schools have been invited to participate in developing this program, and already there have been positive expressions of interest and support from other schools. In June the organization of LISDEC, the Library and Information Science Distance Education Consortium, was completed, and agreements have been distributed for signatures.

We see two major benefits to be derived from this venture. The first is providing access to graduate degree programs in library and information science to people who otherwise would not have this opportunity. The other is a sharing of resources from one school to another. As you know, programs of library and information science are traditionally relatively small in the overall scheme of things. If my students can have access to a specialization from another school, our program is greatly enhanced. Related to this is the possibility of taking advantage of courses needed by our own students but not offered on our campus in a given semester or academic year. It is the latter two possibilities that I find particularly appealing--the possibility of expanding our course offerings.

Inherent in all of this is the need for the individual school to maintain complete autonomy over its program in dealing with the following questions:

What courses provided by other schools should and would and could be accepted in a student's program?

How much of a student's program could be accepted away from the campus? How would individual schools use the courses, i.e., let the student enroll in the course as offered by another institution or would the school use it as that school's own course with some live interaction wrapped around the canned course?

The list goes on--and the answers will vary according to the needs of each program.

The consortium idea in distance education utilizing television delivery is not new. A very successful model already exists in the form of the National Technological University, a consortium of schools of engineering. LISDEC is based on that model with some very important modifications. First and foremost, LISDEC will not be a degree-granting agency as is NTU. Each student will be affiliated with a program and will be subject to the rules and regulations of that institution.

Some institutions may be interested in using TV for both degree seeking and non-degree seeking students. Others may restrict the use to non-degree. Still others may see it as a way of providing continuing education.

Membership in LISDEC certainly is not limited to those schools with programs accredited by ALA. In our discussions to date, we have had representatives of ALA, MLA, SLA, and state library agencies participating in our planning. We hope that they and other agencies will continue to work with us. Already two state libraries have joined LISDEC. I believe that we have a unique opportunity to affect all aspects of professional

education--from entry-level degree programs to meeting continuing education needs.

When I was interviewing for the deanship at USC in 1985, 2 of the persons I was scheduled to meet with were the director of the Instructional Services Center and the director of the Office of Telecommunications Instruction. It seemed a little strange to me, but why not? I had received some background about the TV program at USC which was really getting into high gear about that time. One of the questions addressed to me was whether I would be interested in teaching in the TV program. Quite frankly I wasn't sure I wanted to. However, it didn't take long for me to appreciate how important the TV program at USC has been to our program and to our state. The director of the Office of Telecommunications Instruction frequently chides me about my initial reaction to TV--and how a considerable amount of my time now is spent in working on this aspect of our program.

We do recognize that TV is not the answer to all our problems. It isn't always suitable for a course. It isn't always suitable for a faculty member. It does raise questions about faculty load. There are sometimes problems about resources at various sites, including facilitators and mentors and books and hardware and software. It causes us to rethink some of our basic teaching philosophies. It is a challenge.

On the positive side, it makes it possible for us to reach bright, eager, place-bound students who otherwise might not enter the program. It probably causes us to be more structured and organized in our presentations. It should make us more keenly aware of the need for ongoing curriculum revision.

There is a world of possibilities associated with TV, and participation in the Consortium--whether as a producer or as a user--will give each school the opportunity to control its own use of the medium at whatever level the school believes to be in the best interests of its constituencies and programs. The greater the participation, the easier it will be for us to turn the challenges that arise into opportunities. It seems particularly appropriate that we are moving ahead with these plans in the last decade of the century--an opportunity for us to be on the cutting edge of technology as we approach the 21st century.

As we look toward the year 2000, it is my view that we need to define a broader role for library education than has been necessary in the past and from that broader role to seek a larger constituency in the overall information field than we have had heretofore. Towards this end, we must re-examine ways

of meeting our responsibilities to libraries and librarians, at the same time expanding our charge in order to prepare our graduates for work in a greater variety of situations. As circumstances have changed, as more graduates have begun to enter non-traditional positions (still listed as "other" in placement surveys) and as graduates entering the traditional library field have met with expanded employer expectations, we find ourselves with the opportunity to develop programs that will take our graduates into new and different work arenas.

I say programs, in the plural, because I believe that we need to stop thinking about a single all-purpose curriculum and think rather of alternatives or options leading towards a variety of ends. These alternatives may mean. redefinition of our entry-level professional degree for librarians, the institution of additional entry-level programs and degrees, more innovative ways of delivering our educational programs to distant learners, and more cooperative endeavors with other campus departments and schools.

As you can tell, I've identified more challenges to library educators than answers. I am, however, grateful for this opportunity to do a little gazing into my crystal ball. It may seem a little cloudy or even cracked! Only time will tell. If you have questions, I'll be glad to try to answer them. Thanks for your attention.

LEADERSHIP IN THE 90'S

BY

DR. BROOKE E. SHELDON

LEADERSHIP IN THE 90s

by

BROOKE E. SHELDON

I am thrilled to be here with you today, and it takes me back almost thirty years ago, when as a new MLS with fully eight months experience, the Special Services Officer, one Lt. Craven at Ent Air Force Base in Colorado Springs, led me across the base into the Special Services Building. At the head of the stairs a large, stern looking Master Sergeant stood with arms folded awaiting the new librarian. She was scary! But I was lucky. Ent, as you know, was the housekeeping base for ADC, the Air Defense Command, and so the Command Librarian, Harriet Rourke, took me under her wing.

I thought of this incident when I looked at the questions I was asked to address today by the conference planners. One is: How will our profession foster the development of new leaders? And one of the answers is, we will do it the way we have always done it--the way Harriet Rourke did it--the way it's been done by Jerry Orne, Bob Lane, and Norman Varieur over the years--by senior librarians identifying promising young newcomers and becoming their teacher, their coach, their protector, the person who opens doors. (When we were transferred to Germany, Swabish Gmund, Frances O'Halloran, Chief of Army Libraries, was ready with a job for me.)

Harriet Rourke counseled me on skills that needed to be improved; she suggested career directions; when I lost out on a job because I talked about it and alerted a better qualified person, it was Harriet Rourke who gently but firmly reminded me of the need to be discreet.

Library schools, professional meetings, self-education all will help develop leaders, but there is no substitute for a positive role model, a mentor who inspires. Increasingly, in all of the professions there is growing awareness that the presence of mentors and/or role models can be a critical factor in one's career. The mentor phenomenon has been with us a long time, but only recently has it been recognized as necessary, and only recently have our professional organizations and library schools consciously begun to develop mentoring networks.

Well, I have somewhat inadvertently plunged into the middle of my speech without a proper introduction and outline of what I plan to do. So I now want to backtrack and do that. As you may know, all of the speakers were sent scenarios for their

speeches. When I read mine, I wasn't totally enthusiastic, because as you know I've just finished a book on leadership, and I naturally think I know a lot about it, and I already had a tentative plan for what I wanted to say today. But as I read the scenario, I thought, well, I can respond to these questions, and please the conference planners--so here's the scenario as presented to me.

"The library world is not noted for having strong leaders. How can we overcome this? What must library schools, associations, and today's leaders do to develop strong leaders for tomorrow? What skills must they demonstrate? How will our profession foster the development of new leaders and, once at the helm, in what direction will these new leaders move the profession? Should tomorrow's leaders be more proactive in their roles? If so, in what ways? How will we retain these leaders once we develop them? How do you see technology affecting library leadership in general? How do you perceive the changing workforce affecting library leadership, both in terms of who will be leaders and who will be followers? And, finally, how will tomorrow's library leaders meet the challenges of the next century?"

Naturally, I can't answer all of these questions, but I'm going to try to at least touch on all of them this afternoon with less emphasis on those that overlap heavily with areas covered by Galvin, Schneider, and Roper.

Number one. The library world is not noted for having strong leaders. How can we overcome this? In order to answer this I need some help now. Would you all please think about the best boss you ever had. . . what were his/her qualities? I'll give you a moment to think about it. (Discuss with audience concerning these qualities.)

Now let's look at these qualities. Would you consider your boss a leader? What is the striking thing about these qualities? Right! They are qualities that we all have--or could have to a greater degree if we wanted to develop them. Chances are the best boss we ever had was not noted particularly for her charisma; our best boss was probably bright, but not necessarily brilliant.

Warren Bennis says in Leaders, "Leadership seems to be the marshaling of skills possessed by a majority but used by a minority. But it's something that can be learned by anyone, taught to everyone, denied to no one." (Leaders, 1985, NY: Harper, p. 27.)

The statement from our conference planners, that the library

world is not noted for having strong leaders, may be partially true; I'm not convinced that it is true, but what is a fact is that we suffer from a poor self image. What is true is that we underrate ourselves. Penny Abell, University Librarian at Yale, feels quite strongly about it. She says, "We better stop being so negative, and we'd better start being a whole lot more concerned about the kind of developmental experience and the kind of modeling we are doing, and the kind of opportunities that we are giving people to demonstrate their abilities to lead."

Richard Daugherty, current ALA President and professor at Michigan, calls for more recognition of leadership, and is critical of the profession in this regard. He says: "We seem to revel in people's failures. We speculate about why somebody is having trouble or got ousted, but we do very little in terms of honoring those who have been successful. This profession needs successes, as many as possible. We'll all benefit, bask in the successes."

We need more of the kind of study done by Jim Matarazzo for the Special Libraries Association, which pinpoints the tangible worth of the special librarian. What else must library schools, associations, and today's leaders do to develop strong leaders? Dr. Roper has given us some very fine ideas about potential library education in the future. . .I think that library schools really have the best shot at developing leaders. . .and they can do it in several ways.

1. Research. We need to know more about the nature of leadership in our field. There have been very few studies, with the exception of Alice Gertzog's study in 1986, which centered around such questions as: who are the perceived leaders? To what degree is the meaning of the term leadership shared throughout our field? Do those who are perceived as leaders share similar patterns of background/behavior, career experiences? To what extent do publishing and participation in professional organizations relate to perceived leadership? And some other studies on the behavior of library directors and its effect on the organization. A current dissertation in progress at Texas Woman's University by Janis Bandelin uses citation analysis to examine the nature of the publication records of Gertzog's 115 leaders.

But if we had greater understanding of how our leaders successfully cope with change, their risk taking and decision making behaviors, it would not only enable educators to do a better job of recruitment, but also enable them to design better leadership development programs as part of library education. More definitive understanding of qualities needed to be

successful in this field would help admissions committees identify the most promising applicants. It is apparent that as applications soar and our schools grow more and more crowded, simply continuing to raise numerical standards for the GRE and GPA will not necessarily recruit not only the minorities we need, the subject specialists we need, but also individuals with potential to succeed in rapidly changing information environments.

Our profession has been challenged by Herbert White to find and preserve the "wild ducks," those individuals who will ask the difficult questions, who will not be afraid to buck the system, who will stand on principle no matter what the cost. In recruitment efforts, our schools should make certain that these "wild ducks" are not weeded out.

2. Curriculum. Most master's programs require a course in management and additional courses in various types of library administration, as well as the occasional specialized course in personnel management, fiscal management, communications (interpersonal and group dynamics), etc. Most of the basic management courses at least touch on leadership skills, and certainly there is overlap between management and leadership, but generally the focus is on such traditional elements of management as planning, organizing, staffing, directing, controlling, and effectiveness measures as applied to libraries.

Students need to know all of the above, but if the approach is linear, relies heavily on technical skills for solving problems, and sidesteps the essential behavioral attributes needed, then we are not producing graduates who are knowledgeable about their own strengths and weaknesses, and who have that strong set of personal values and beliefs that Dr. Galvin talked about this morning. Bennis (1985) makes the point that "Most management education makes certain assumptions that are dangerously misleading--namely that the goals are clear, alternatives known, technology and its consequences certain, and perfect information available."

Rather, we should be teaching our students the distinctions between leadership and management. Again, Bennis (1989) makes a plea for teaching students to be innovators, rather than administrators; to focus on people rather than on systems and structures; to have their eyes on the horizon rather than the bottom line; to challenge the status quo rather than to accept it; and, finally, to "do the right thing" rather than "do things right." I might phrase it a bit differently and say that we should teach ourselves to be innovators as well as administrators, to focus on people as well as on systems, etc.

Don Riggs, who will speak to you tomorrow, has an excellent volume of essays on library leadership (1982). In it Michael Gorman writes:

The essential differences between management/ administration on the one hand and leadership on the other is that the former is concerned with what is and the latter is concerned with what will be. One accepts the status quo (and often yearns for the status quo ante); the other dares to imagine and to create the future. In technical services, the manager/administrator strives to make the returns of the current system as great as possible, whereas the leader seeks better alternatives to the current system. (p. 74)

As Richard Budd, Dean at Rutgers, expressed it, "The goal of education is to prepare students for their last job rather than their first--to put them in a position where they will continue to prepare themselves for upper level jobs." Both managers and leaders are needed, but library education should not continue the status quo that is, only educating students to make things run smoothly, control people and resources. We must also prepare them for creative, highly proactive roles.

Kouzes and Posner (1987) have noted that "traditional management teaching would have us believe that the ideal organization is orderly and stable. Yet when successful leaders talk about their personal best achievements, they talk about challenging the process, about changing things, about shaking up the organization" (p. xvi).

The library leaders I interviewed for my forthcoming book are very much in tune with current management trends; they have been among the first to shift away from a somewhat mechanical model of planning and efficiency focused primarily on assessing needs, setting goals, etc. The new approaches do not throw out the systematic approach, but they place much more emphasis on creativity, risk taking, innovation, and even intuition. As in Kouzes' study of the corporate sector, I found the library leaders generally to be almost the opposite of cool, aloof, and analytical; rather, they are passionate, intense, caring, and kind. How can our professional schools foster these elusive leadership qualities? Indeed, how can our professional schools, our associations, all of us who supervise others develop leaders?

Whether we are talking about library school courses or continuing education agendas for organizations like this one, we need to devise and disseminate leadership training. We need to make opportunities available to large numbers of librarians at all levels of the organization, training opportunities that include the following elements:

1. Specific knowledge of one's own strengths and weaknesses; understanding and acceptance of oneself is a basic quality of leaders. That is why at the Center for Creative Leadership in Greensboro, North Carolina, all institutes begin with self-assessment and the results are applied throughout the sessions to help participants relate concepts to their own natural styles of leadership.

At the first Snowbird Leadership Development Institute held in Utah this summer, and funded by Dynix, the 30 participants took the Myer Briggs and several other self-evaluation tests. We had skilled interpreters there, and the results of the tests formed the basis of the rest of the week. It was a marvelous experience. In putting the curriculum for Snowbird together, we agreed that participants needed to 1) understand the difference between management and leadership. 2) Understand how change occurs and effects the immediate environment; understand how to create change. 3) Understand risk taking as it relates to leadership vis a vis management (very often ability to make decisions in the absence of full information). 4) Understand the positive uses of power. 5) Develop skills in conflict management. 5) Develop skills in communicating, negotiating, clarifying, and recommending policy options.

As at Snowbird, it would be important for all training sessions to allow time for an introspective analysis of the participants' leadership style, accompanied by a self-development plan for improvement. Snowbird is a national institute and it will be an annual event for recent LS graduates from all types of libraries, but it is just a drop in the bucket. However, the model is a great one--associations could replicate this--other vendors could sponsor similar institutes. Because proactive librarians are needed at every level of the organization, we ought to have a national goal that every single professional librarian has access to leadership training.

Well, I've talked about the skills librarians must demonstrate and I've agreed that librarians must be proactive. I'd like to conclude with a brief examination of the last question, how will tomorrow's leaders meet the challenges of the next century?

In researching an article I wrote last year for the Journal of Library Administration on strategic planning for the next century, I found that many outside of our field are optimistic about the future role of libraries. Edward Cornish, then President of the World Futures Society, says, "Big changes seem certain as libraries face a major identity crisis: just what is their future in society, and how should they operate?"

He goes on to describe the increasing use of disks, electronic networks, the globalization of libraries, possibilities for recording tastes and fragrances, the advantages of on-demand publishing, and concludes that: "In the future libraries will do an even better job in handling this communication across space and time. The sights and sounds and even the tastes and smells of life today will be preserved in the libraries of the future for our children and grandchildren."

Sometimes when I read, as I did a couple of weeks ago in the Dallas Morning News in a special section on home computer use, about the proliferation of databases, growing easier and easier to use, and access from a computer at home, and when an article like this advises the reader to "for now, since many of these databases are still quite expensive use your public library--it's the best bargain in town"--for a moment, I feel a little quiver of concern. And when I read that lawyers are better than librarians at searching LEXIS and WESTLAW, I feel another small ripple of dread, but then I realize, as we must all realize, that this is not the point. The most sophisticated our users become the better. The challenges for information professionals in the next century will be in anticipating what information needs will be, in making the right decisions about what information should be stored, saved for their clients' use.

As I noted in my article, environmental trends and forecasts need to be interwoven into the planning process for libraries. Currently, in my view, economic, technology, and other forecasts are often used as part of the needs assessment, but in many cases quietly put aside as librarians go about putting together a plan that is highly reflective of the status quo. For example, how many librarians have even considered using robots to perform routine tasks to free themselves for higher levels of service?

On the other hand, library planning suffers to some degree from overestimating the rate at which technology will be adopted by its clients and its staffs. Some technologies diffuse to high levels of adoption, but many others never go on to fulfill their early promise. We have always overestimated some (robots, speech recognition, videotext) and underestimated other (cable TV, videocassette recorders, and microwave ovens).

It points up the need to take technological innovations into consideration, but develop plans that allow for longer or shorter diffusion rates. . .or even project technology that may succeed wildly or fall flat on its face. Similarly, we must plan for economic upheaval and economic stability; for recession and expansion; for peace and for war.

I suppose that to be a leader in this kind of world, the kind of world we expect in the 90s, is to be a person who is extremely comfortable with ambiguity, who rides out change, who creates change, who takes risks, but I really think that these qualities are not, and will not, be as important as the person who can take the hopes, aspirations, values, and yes, goals that have been articulated by staff/clients and translate them into a tangible and yet very simple credo that all employees can relate to and visualize. "It will be the task of the leader in information based organizations," says Peter Drucker, putting it more mundanely, "to formulate clear, simple common objectives that translate into particular actions." He also advises that such organizations focus on a few objectives at a time.

Drucker and Bennis and others say articulate the objectives, and inspire others. I found in my study of library leaders, as did Bennis, that it's not just the ability to articulate one's goal, it is persistence--through thick and thin, through overwhelming odds--a quiet persistence, a consistency of approach, that brings success. I have many examples of it in my forthcoming book, Leaders in Libraries: Styles and Strategies that Succeed. The library leaders of this past century have had this quality; the leaders of the next century will have it also. Mark my words.

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INTRODUCTION TO FUTURE LIBRARY TECHNOLOGY

BY

DR. DONALD E. RIGGS

INTRODUCTION TO FUTURE LIBRARY TECHNOLOGY

by

DONALD E. RIGGS
Dean of University Libraries
Arizona State University
Tempe, Arizona

Library technology is an interesting phenomenon. It provides a forum for predicting the future of libraries. Some have predicted that technology will cause the demise of libraries as we currently know them. These are the same experts who in the 1960s were predicting the end of books and libraries along with a revolution in education based on teaching machines and new media. Important advances were made, but the extravagant forecasts failed to materialize. There were more books published in 1989 than in any other year in our civilization. The use of libraries is at an all time high. We need to continue to develop and support libraries because they work, and because they contain the knowledge resources upon which our information society is based.

The most dramatic predictions about the future of books, libraries, and information technology tend to be made by people of thought rather than by people of action. Nothing is impossible to the person who does not have to do it. T. S. Eliot is noted for stating that "there is a giant shadow between the idea and the act." We need to lay to rest the simplistic idea that electronic technology in the hands of information entrepreneurs is going to put an end to libraries. Libraries are here to stay, but by no means are they going to remain the same. Technology is a tool which will enable libraries to deliver service in a more efficient manner.

Brief History of Library Technology

As early as the 1930s, punched-card equipment was used in library circulation and acquisitions. Shortly after this breakthrough, other technology-related applications were made to library procedures. However, the movement was very slow and the most practical data processing application could be found in library circulation. In 1945, Vannevar Bush displayed unusual vision by urging scientists no longer dedicated to the war effort to turn their creativity to making knowledge more accessible. The device he envisioned, which he called a "memex," was a desk that incorporated a numerically-controlled microfilm store, reader, and camera. The stored information would include both published works and personal records; several

items would be visible simultaneously at high resolution. He pointed the way for technological developments that have only recently emerged; displays that can show several documents at once; personal machines for creating and organizing notes and papers; and hypertext for systems generating links between items of information. The 1960s brought time-sharing computers which enabled libraries to realized some value from cooperative ventures. The Library of Congress, inmid-1960s, began using computers for producing machine-readable catalog records. In the early 1970s, some major breakthroughs occurred in library technology; OCLC began its cooperative cataloging project. UTLAS began a similar operation in Canada. A few years later, the Research Libraries Group (RLG) was formed. And regional networks (e.g., the Washington Library Network) were formed to serve a similar purpose. By the late 1970s, minicomputers were being used by libraries (e.g., the National Library of Medicine). Commercial systems for searching reference databases online also emerged (e.g, Bibliographic Retrieval Services, BRS; DIALOG/Lockheed). The one significant invention was the online public access catalog. This tool began replacing the traditional card catalog in the early 1980s.

The Online Catalog (a Case in Point)

The Arizona State University Libraries' installed their first integrated system in the early 1980s. After changing our vendor two times, in 1987 the Colorado Alliance of Research Libraries (CARL) software was selected to run on the already-owned Tandem computer. Reasons for selecting the CARL software included:

1. CARL is an efficient system written in Tandem Applications Language (TAL).
2. The ability to load multiple databases on CARL gives the option of loading our MARC bibliographic databases as well as our locally-produced databases/indexes.
3. CARL is very user friendly and requires little library instruction.
4. CARL allows easy connectivity with other computer systems.
5. It has a demonstrated record of high reliability.
6. It is a superb system for networking with other libraries.
7. Flexible and sophisticated transaction monitoring is available on CARL.
8. Our contract with CARL gives us access to the source code.

As of October 1990 the Arizona State University (ASU) online integrated system has the following configuration:

Local functions: Online catalog, circulation control, and reserve component.
Hardware: Tandem; four non-stop II central processing units and one TXP central processing unit.
Current storage: 14 gigabytes.
Software: TAL (Tandem Applications Language). Ports: 232; 20 are allocated for connection to the campus broadband network (through which dial-up is possible, plus use from faculty offices and remote computing sites on campus sites on campus).
Number of titles in online catalog: 1.4 million MARC records.
Number of databases/files in online catalog: 18.
Gateway to CARL headquarters in Denver: 9600 baud leased line/expand; used for software updates and access to UnCover.
Other libraries using ASU's system: ASU West Campus; American Graduate School of International Management.

CARL supports full keyword searching and has five basic indexes. Each library or database supported in the CARL software can determine how indexing will occur. The five basic indexes include:

Name -- Usually indexes authors, corporate names, or personal name subjects.
Word -- Usually indexes keywords from titles, subject headings, notes, or abstracts.
Title browse -- Indexes title strings and supports exact title searching.
Call number browse -- Indexes call numbers.
Series browse -- Indexes series.

Locally-loaded Databases at ASU

The traditional card catalog normally reflected only about 60 percent of a library's total holdings. An online catalog provides the opportunity to reflect bibliographic records of a library's complete holdings. ASU has taken a leadership role in mounting databases on its online catalog (e.g., we were one of the first libraries in the world to load the H. W. Wilson indexes in an online catalog). Eighteen databases are currently on our online catalog; they are:

1. General Catalog. All of the OCLC-cataloged MARC records are located in this database. At the present this includes 1.4 million full MARC records, and the ASU libraries are about 97 percent converted.
2. News and Help. A submenu of reading files are available to provide users with all sorts of general information, such as library hours, more detailed explanations of what is contained in databases, library code of conduct, etc.

3. Encyclopedia. This is the full text of the Academic American Encyclopedia, which consists of approximately 30,000 articles and is updated twice per year.
4. Song Index. This database is locally produced by the ASU Music Library and indexes collected works of music. Each citation includes the composer, librettist, title of the song, first line of the song, and title and call number of the collected work from which it came.
5. Career Services: Company. This database indexes over 2,000 company names and addresses for which the Career Services on campus has information. As a non-bibliographic directory type database this file provides information to students who are looking for jobs. This file includes when each company is interviewing on campus and what kind of information Career Services has on each company (e.g., videotapes, annual reports, benefits information, etc.).
6. Career Services: Calendar. This database lists orientations, workshops, special events, jobs, advisement, and a recruiting master file for Career Services.
7. Career Services: Books. This file includes the cataloged monographic collection from Career Services.
8. Humanities Index. This H. W. Wilson database covers 295 English-language humanities journals from 1983 to present.
9. Applied Science & Technology Index. This H. W. Wilson database covers 335 English-language journals in engineering and the applied sciences from 1983 to present.
10. Social Sciences Index. This H. W. Wilson database indexes 300 English-language journals in the social sciences from early 1984 to present.
11. General Science Index. This H. W. Wilson database indexes 111 English-language journals in the physical, life, and health sciences from 1984 to present.
12. Education Index. This H. W. Wilson database indexes 335 English-language journals in all areas of education from late 1983 to present.
13. Business Periodicals Index. This H. W. Wilson database indexes over 300 English-language business journals from 1982 to present.
14. UnCover. This database is not stored locally but is available via a transparent gateway between the ASU CARL system and the CARL system located in Denver. The database provides access to title-level information on about 9,000 journals. The database can be searched using keywords, or a user can re-create a table of contents for a specific issue of a journal.
15. Map Index. The ASU Map Collection has a collection of over 160,000 maps. This collection has been indexed in a batch KWOC (keyword-out-of-context) system since the early 1970s. The file has been transferred to the ASU CARL system as a separate database and is now maintained online. Each

map has extensive indexing, and it is not unusual for a particular entry to have more than 25 subject headings.

16. ASU Newspaper Index. This database indexes Insight (the faculty and staff newspaper) and State Press (the student newspaper).

17. Solar Energy Index. ASU has one of the most complete special collections on solar energy and alternative energy sources in the world. This locally-produced file indexes journal articles, archive and manuscript materials, technical reports, and pamphlets. Much of the material found in this collection is unique and not found elsewhere, making this file an invaluable national resource.

18. Arizona Statistical Database. This file gives statistics on various Arizona economic enterprises and on economical trends and issues. For example, by checking this database one can find the number of building permits issued on a given day in any city in Arizona.

A number of other databases are under development and will soon become operational. Some of these include: The GPO Monthly Catalog (this will include over 250,000 MARC records which were obtained from MARCIVE, Inc.), a grants database, a Southwest database, and a collection of AMC MARC records from libraries throughout Arizona.

Since there are numerous databases we could have loaded into our online catalog, we developed a list of criteria to be used when deciding which databases should we mount. Some of the criteria include:

1. Cost.
2. Disk storage.
3. Backfile availability.
4. Size of clientele served.
5. Preeminence of program supported.
6. Searchability in local systems.
7. Workstations used for searching.
8. Currency. (1)

The online catalog has created a significant increase in the use of the ASU library collections. Following is the number of times the databases were searched (opened) on a typical day.

Online Catalog statistics for November 14, 1989

<u>Database</u>	<u>Number of Opens</u>	<u>percentage</u>
ASU General Catalog	5,159	58.00%
News	166	2.00%
Encyclopedia	435	5.00%
Song Index	52	.50%

ASU Newspaper Index	122	1.30%
Career Services Companies	99	1.00%
Career Services Calendar	27	.30%
Career Services Books	103	1.00%
Humanities Index	287	3.20%
Applied Science & Tech. Index	365	4.10%
General Sciences Index	329	3.70%
Education Index	597	7.80%
Business Periodicals Index	326	3.70%
UnCover	425	4.80%
Map Index	48	.40%
Solar Energy Index	33	.40%
Total opens	8,786	100.00%

The "opens" indicate the number of times a particular database was selected from the online catalog screen; however, there is presently no way we can measure how long a user spent searching a specific database.

Future Implications -- Online Catalog

The public access online catalog is one of the best innovations brought forth in the library world. It has substantially elevated access to the library holdings. The dial-in capability enables users to access not only their local libraries but practically any library in the world. Internet (a network of linked networks) makes it possible for remote users to access national online information systems or databases. Internet is not a single network; it incorporates the ARPANET, NSFNET, and many regional networks, which operate using the same family of communications protocol (e.g., TCP/IP).

As more databases are added to the online catalog, there will be an exponential growth in the demand for new terminals. An added demand will be the request for more printers attached to the terminals. As more databases are added, the expectation for additional files will occur.

Two diametrically opposed misconceptions occur with library users. Some users tend to believe that a computer is always correct and offers all possible information, not realizing the scope and limitations of databases they are searching. In other cases, the computer phobe is afraid and mistrustful of all information retrieved from one or more of the databases. Sometimes users do not discriminate between computer terminals and think that an optical disk workstation is the same as an online catalog terminal. One goal of library instructional activities is to try and encourage users to seek skilled assistance.

Future expectations of the online catalog users include having more full-text materials loaded into the online catalog. Users do not understand why more full-text materials are not available via the online facility. The user wants the capability of retrieving the full article from a terminal in the library or at home. Also there is strong indication that users expect to be able to request a book, article, or report from remote terminals and have the item delivered to their home or office.

At the ASU libraries, we have a rather sophisticated array of CD-ROM products and services. Several of these databases are not available in any other format. They are heavily used; however, students keep insisting that these services be carried on the online catalog. They believe all databases of this nature should be available via the online catalog. We also have witnessed that students are not using the paper copies of the H. W. Wilson indexes. If the desired information is not available from one of the online indexes, users go to another online index until they find enough information for their reports and term papers. This is a noticeable downside to the concept of online indexes, since students in particular are not using the paper copy of the H. W. Wilson indexes. Most of the online Wilson indexes do not go back beyond 1983.

We also have OCLC and RLIN terminals in public access areas. Recently, we have been getting complaints about having too many different terminals accessing the various national databases. The suggestion is to have one terminal that accesses all local and national databases. This recommendation is not an easy one to achieve now, but it will have to be implemented in the near future. Users will increasingly expect to be able to access all of the world's databases from one terminal, pull up full-text materials on the screen, and have the desired information delivered to their office or home.

The future of the online catalog is very promising. We librarians are finally being able to provide complete and readily available access (bibliographically and full text) to our users. The vision of the future of the online catalog is truly focusing on the long-awaited dream of the "electronic library."

International Library Utilities

OCLC (Online Computer Library Center) and RLG (Research Libraries Group) are the principal movers and shakers in furthering the ease of access to and use of the ever-expanding body of worldwide scientific, literary, and educational

information. This has been accomplished to date primarily by facilitating technical processing, thus ensuring that the materials within a library are accessible quickly and economically to its users. Both utilities have promoted the sharing of resources, and have built a collected body of bibliographic information in electronic form that have no peers. This body of bibliographic information has added increasing value, not only to the technical services of the library, but also to the reference needs of library users and the entire scholarly and research community.

Both utilities are expanding their range of reference services that will be available in a variety of system environments. Users will be able to access these services via remote and library centralized terminals. These services will continue to have the twofold purpose: Easier and cost-effective access, and access to a much broader range of information.

Utilities like OCLC and RLG serve a critical need. Their endeavors in areas like preservation are meeting an international demand. The future of these utilities will depend on how imaginative they become in recognizing areas that they can do better than local libraries. We are already witnessing a shift beyond their original intent of centralized cataloging and resource sharing to more diverse services (e.g., reference service, document delivery, preservation).

Hypertext and Hypermedia

The word hypertext was coined in the 1960s to describe an environment that supports nonsequential writing and reading; special markings in the text (perhaps a highlighted word or phrase or a special symbol) indicate a link to related information. The definition dimension can take many forms: A definition of a term, an expansion of a summary, a discussion of a related topic, or an annotation. Footnotes are an example of a hypertext mechanism in print, but the term usually is reserved for computerized systems. "Hypermedia" extends the concept of hypertext to include links to nontext materials, such as diagrams, photographic images, or sounds. Systems that support hypertext allow an author to structure material flexibly, without the restrictions imposed by the linear nature of a printed document. However, as privileges convey responsibilities, this flexibility puts a burden on the author to prevent the reader from getting lost in a maze of links. (2)

Effective hypertext and hypermedia depend on how well the author has established the various links. Since following cross-references is much simpler in hypertext than in printed

materials, obvious candidates for publication in hypertext form are encyclopedias and reference manuals. Such applications may become standard as reference services, combining hypertext links with conventional indexing.

Apple Computer's HyperCard is distributed with each Macintosh computer. Since for many, experience with hypertext is limited to HyperCard, there is a misleading tendency to assume that any application of HyperCard is an implementation of hypertext. As well as supporting links between documents (in HyperCard known as "cards") and tools for creating cards, HyperCard also provides mechanisms for activating other software. Although it cannot support large, complex bodies of data, HyperCard can be used to build a consistent, attractive interface for other applications with less effort and less programming experience than usually is necessary. As a result, many HyperCard applications have little to do with hypertext and relationships between pieces of text or pictures; rather, HyperCard has been used as a convenient programming language.

(3)

The jury is still out on the long-range use of hypertext, hypermedia, and HyperCard in libraries. It is my opinion that their use will only be limited by the imagination of librarians. Undoubtedly, their use will become more abundant in the areas of library instruction and training. Workstations will be incomplete without them. And we can expect to see them used more as "front ends" and interfaces to online information resources.

Expert Systems

Machines used in libraries have been those that we have to "talk down" to; however, a rather new phenomenon known as "expert systems" or "knowledge-based systems" now offers the first real framework for machines to "talk up" to us. This emergence of new emphasis on interaction between humans and machines is the result of many years of artificial intelligence research. Artificial intelligence (AI) is a subfield of computer science concerned with the concepts and methods of symbolic inference by a computer and the symbolic representation of the knowledge to be used in making inferences. AI is conceptually defined as a thrust aimed at making computers behave in ways that humans recognize as "intelligent." From this type of thinking, "expert systems" evolved. As originally used, the term referred to a computer system that could perform at, or near, the level of a human expert. Currently, the term is used for a computer system that was developed by AI techniques. This is a rather loose description of expert systems, but

unfortunately it is the way people discuss it in daily conversations. However, for the purpose of this paper, Feigenbaum's definition of expert systems will be followed:

An expert system is an intelligent computer program that uses knowledge and inference procedures to solve problems that are difficult enough to require significant human expertise for their solution. Knowledge necessary to perform at such a level, plus the inference procedures used, can be thought of as a model of the best practitioners of the field.

The knowledge of an expert system consists of facts and heuristics. The "facts" constitute a body of information that is widely shared, publicly available, and generally agreed upon by experts in the field. The "heuristics" are ... rules of good judgment (rules of plausible reasoning, rules of good guessing) that characterize expert-level decision making in the field. The performance level of an expert system is primarily a function of the size and quality of a knowledge base it possesses. (4)

It is important to remember that an expert system is a subset of artificial intelligence and that it truly has to rival the human system if it is to be a genuine expert system. If library applications of expert systems are to function like a human expert, then they must be able to do things human experts do. Expert systems are knowledge-intensive computer programs. Knowledge-based expert systems ask questions, solve problems, explain their reasoning, and justify their conclusions. They use rules-of-thumb (heuristics) to zero in on particular problems/issues and symbolic logic is used in order to rationalize the knowledge they are presented. (5)

Languages and Shells

If the library's expert system is being built from scratch, one of several programming languages may be used. In the United States most people will choose LISP as their programming language, while the British will choose PROLOG. Without getting into the pros and cons of the two languages, the language selected must have two important components: an inference engine and a body of rules. The rules should be established first to allow concepts to be expressed. After the rules are in place, the inference engine can be constructed. The inference engine will normally be either a test-and-hypothesis (forward-chaining) or hypothesis-and-test (backward-chaining) process.

In lieu of starting from scratch in developing the expert system, it is now becoming very common to use skeletal systems (shells). A "shell" is a software package designed for the

creation of specific expert systems. Examples of PC-shells are Expert Ease, Insight II, Guru, 1st Class, and Personal Consultant. Prices for these shells vary from \$100 to a few thousand dollars. Put briefly:

A shell + specialist knowledge = an expert system

Shells have to be easy to use but must be quite powerful with a capacity to handle a large number of rules. The rule-based systems contain strings of statement in the "if .. then" format; for example, if A is true and B is true, then C is also true. In a skeletal system all domain-specific knowledge is presented as rules, rather than as code in the inference engine.

User Interface

One of the major obstacles in artificial intelligence and expert systems development has been the inability of users to communicate easily with the computer. Frustrations resulting from this inability have severely dampened the enthusiasm for interacting with programs offered by new technology. An intelligent front end is a user-friendly interface to a software package; the interface uses expert systems techniques to enable the user to interact with the computer using one's own terminology rather than that demanded by the software package. In some instances, software programs would be technically incomprehensible and/or too complex for the user without the intelligent front end.

If expert systems are to be available in public areas (e.g., reference) for users, then there is little choice but to adopt intelligent front ends to the systems. Many of the current expert systems are incomprehensible by laypersons; the reason for this is they were constructed to be used by a small elite of computer personnel.

If library users are to enjoy using expert systems with minimal frustration, then the intelligent front ends must provide very easy access. Why should accessing an expert system or an online catalog be any more difficult than shifting one's car from park to drive? Intelligent front ends provide the opportunity to make our libraries truly "user friendly."

Chief Components of an Expert System.

1. Knowledge base. This component embodies the human's expert knowledge about the problem domain. This is undoubtedly the vital part of the expert system. The knowledge base contains facts and rules; rules are presented in the "if this, then that" mode. Knowledge engineers work with librarians in

gathering expert knowledge and coding it into the knowledge base. Library users rely on the knowledge base's comprehensiveness for answering complex questions.

2. Inference engine (the reasoning mechanism). The most important task of the inference engine is that of applying the knowledge in the knowledge base in order to reach some decision or assessment. This function not only controls, but interprets the search through the knowledge base. Two strategies are built into the system for control purposes: they are forward thinking (or data-driven or bottom-up control) and backward chaining (or goal-driven or top-down control).

3. User interface. The interface component allows the system to send messages to the user, and permits the user to communicate with the system. Users have, however, limited possibilities for interrupting dialogue with the expert system; this is a major shortcoming in the expert systems currently used in libraries.

4. Explanation mechanism. This part of the system explains to the user how and why a decision or assessment has been reached. The user is entitled to know the rational basis of the system's decisions. It is a normal practice for an expert system to justify its decision by displaying a list of steps taken to arrive at a particular decision. (6)

Library Applications

The application of expert systems to library activities remains in the infancy stage. However, several experimental projects are underway and some projects are currently being used by librarians and patrons. There is much optimism on the part of expert system enthusiasts that expert systems can be applied in most areas of the library. The current main drawback in the use of expert systems in libraries is the limited knowledge domain that can be developed. For instance, an expert system can be created for a particular area of reference service, but it is not possible at the current time to create a knowledge domain to accommodate all aspects of reference service.

What are the reasons for implementing expert systems in libraries? First, expert systems will improve the daily work of librarians. For example, an expert system will assist the librarian in realizing an improvement in productivity (e.g., processing more books, conducting more online searches, and serving more users each day). A well-programmed expert system will also improve quality. An expert system, for example, will be less likely to make human errors in answering questions and be more consistent in providing the same information time after time. Library areas that are eligible candidates for the application of an expert system include cataloging, database searching, indexing, management, and reference.

Cataloging. Since much of cataloging is rule-based, it is an area that can benefit greatly from an expert system. Consistency and quality can both be improved in cataloging by using expert systems.

A past dream of a cataloger would include having had an expert system during the implementation of the 2nd edition of the Anglo-American Cataloging Rules (AACR2). Many days were spent teaching the proper use of AACR2. If the technology were available, an expert system could have saved a tremendous amount of time in instructing the cataloging staff on the new rules. Consistency and quality would have also been enhanced by a knowledge-based system.

Several examples exist whereby expert systems could be used in cataloging. Series work, for example, has been described as one of the most problematic aspects of descriptive cataloging at the Library of Congress. Expertise in series is scarce and it becomes scarcer when trained librarians leave LC. An expert system is ideally geared to handle series work.

Database Searching. Online database activity can be enhanced by using expert systems. An expert system can assist the library user by:

1. Ascertaining the user query.
2. Identifying the potential databases.
3. Identifying the conceptual components of the query.
4. Expressing the conceptual structure in terms of the fields of the selected databases, keywords, and Boolean logic.
5. Accessing the database using the necessary protocol.
6. Entering the search logic.
7. Analyzing the search results.
8. Revising the search strategy.
9. Broadening and narrowing the search.

Much work remains to be done in designing effective front-end expert systems for database searching. Users normally have their most difficulty in properly accessing the databases. The ideal front end system would draw a user profile, select the type of search required, identify the appropriate databases, and then quickly delineate the primary terms/words on the topic to be searched.

Indexing. Automation has been used for some time in performing certain indexing aspects. The intellectual parts of indexing are not yet automated. However, efforts are underway in applying expert systems to indexing; for example, Susanne Humphrey at the National Library of Medicine is directing an indexing project (Indexing Aid Research Project) which is

encoded in frames. Rules are used in adding headings and subheadings. We will begin witnessing greater use of expert systems in the indexing of journal articles. The intelligent characteristics of an expert system will assist the indexer by:

1. Identifying concepts discussed in the journal article.
2. Translating the concepts into verbal descriptions.
3. Translating the verbal descriptions into subject descriptors.
4. Applying the appropriate rules governing the assignment of descriptors.
5. Assigning the descriptors and including subdivisions to the article.

Management. Few, if any, management expert systems are currently being used in libraries. Soon library directors will be consulting management expert systems via their personal computers on a daily basis. There is a void in this area that will be filled when expert systems become a natural part of the manager's decision-support system.

Areas that are appropriate for library management expert systems include:

1. Personnel planning and recruitment.
2. Collection development.
3. Construction of new buildings.
4. Utilization of existing space.
5. Accounting and general budgeting.
6. Strategic planning.

Reference. Reference service is a very complex endeavor, and one should not surmise that all reference personnel can be replaced by an expert system. The interaction between the reference librarian and the user carries with it many unanticipated challenges and other human anomalies. As expert systems and other products of artificial intelligence become more sophisticated in library practices, they will become a significant component of the reference librarian's work day. Dowell and Crews project several advantages for using expert systems in reference service; they include:

1. Reference service can be provided even when a reference librarian is not available for consultation -- either because the library is not open or the reference desk is not open, or the reference librarian is too busy.
2. Depending upon the expert system architecture, reference service can be provided at a number of locations throughout the library -- not just at the reference desk.
3. Expert systems can be designated to provide library instruction -- thereby taking a large amount of drudgery work away from the reference librarian.

4. A typical reference librarian possesses a vast amount of knowledge about the library collections, reference clientele, the institutions they work for, productive search strategies, and out-of-the-way but useful reference sources. Expert systems can be designed to capture this knowledge so that it would not be lost when the librarian retires or resigns.

5. Expert systems can serve more patrons, especially at peak hours, resulting in more satisfaction and without having to hire more reference librarians.

Examples of some expert systems in reference work include:

1. Online Reference Assistance (ORA) is a reference expert system developed by James Parrott at the University of Waterloo Library. The Waterloo system was designed to suggest sources to help answer factual questions and provide assistance with bibliographic instruction activities.

2. PLEXUS is a system that is actually a prototype of a library system for referral. It was developed by Helen Brooks and Alina Vickery at the University of London. PLEXUS is a welldefined universe focusing only on gardening. This system refers users to resources about gardening such as those found in guides to reference sources and in directories to online databases. Users interact with the system to develop an effective search strategy, search the database, and evaluate (with assistance from the system) the results of the search. A list of annotated sources on a particular area of gardening is the final product.

3. ANSWERMAN, developed by Sam Waters at the National Agricultural Library, is designed to help users in finding answers to ready-reference questions. A series of menus help delineate the question and identify the type of reference tool needed (e.g., atlas, dictionary). It also serves as a consultation system and as a front end to external online databases and CD-ROM reference tools.

4. POINTER, developed by Karen Smith at SUNY/Buffalo, is a system that "points" users in the direction of government publications which will provide the answer to a particular question. Users of POINTER make choices from menus, and the system responds with the names of specific sources, call numbers, and instructions.

Impact on Library Staff

Library users will take to this new technology like ducks take to water. The trick is to design easy-to-use systems (e.g., an effective front end system). There will be little or no problems with the users.

The persons in the library environment who will "suffer" the most from the implementation of expert systems will be the staff (professional and nonprofessional). The thought of being deskilled by a machine is a bit frightening for anyone. Some of

the de-humanizing aspects associated with computers cannot be avoided. However, librarians should not jump to the conclusion bordering on their being replaced by an expert system. This is not going to happen unless the librarian is already performing clerical tasks. OCLC did not and will not drive catalogers into unemployment status. Positive aspects of their new technology should be emphasized; expert systems can make the librarian's life much better. They will enable librarians to use their time for more creative, job-related activities. After all, do we librarians not want to devote more time on professional work and less time on time-consuming, repetitive tasks? (8)

Another New Dimension

The central thrust of expert systems is to mimic the functions of the human brain. The human brain distributes information across a vast network of nerve cells (neurons). Recent and future advances in neural networks will play a significant role in developing the capabilities of expert systems. Creating artificial neurons (similar to those in the human brain) that are interconnected will permit the sharing of information and performing tasks simultaneously. This two-dimensional approach works best at recognizing patterns. Instead of looking for patterns, expert systems distill the decision-making process used by human experts into rules of thumb. It is predicted that a combination of expert systems and neural networks could find the answers to those problems too complex for either to solve alone.

There is much more research required before one can truly replicate the human brain. Nevertheless, a much better understanding is being grasped on how the brain functions. Combining the principles of neural networking with library expert systems will result in a powerful "intellectual" library tool. We will probably not see this combination occurring until around the latter part of the 1990s. (9)

Conclusion

Now, more than any other time in our civilization, is the most exciting time to be a librarian. To paraphrase Isaac Asimov, "Machines will do the humdrum work of librarians. The computers will keep the libraries going, and librarians will be free at last to do things they should be doing -- to create." Online public access catalogs are enabling libraries to provide greater access to their collections and services. We will continue to enjoy the many favorable benefits provide by the OPACs. When expert systems are more fully developed, libraries will be able to deliver more efficient and effective service. This new technology will provide a dramatic improvement in productivity in libraries. In 1964 Jesse Shera stated, "We can

build machines to do library work... the machines are ready for us... but we are still very far from being ready for machines." In a nutshell, are we librarians ready to take advantage of the new library technology? I believe we are.

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ARTIFICIAL INTELLIGENCE/EXPERT SYSTEMS/HYPERMEDIA:
INTRODUCTION AND APPLICATIONS

BY

DRS. LARRY BIELAWSKI AND ROBERT LEWAND

ARTIFICIAL INTELLIGENCE, EXPERT SYSTEMS AND HYPERMEDIA

by

ROBERT LEWAND and LARRY BIELAWSKI

Goucher College, Towson, Maryland 21204

In this paper we focus on intelligent systems that are based on the integration of expert systems and hypermedia technology, for together they offer a rich environment for creating computer applications that can increase productivity enormously and act as intelligent assistants. Furthermore, though hypermedia and expert systems technologies date back thirty or more years as independent technologies, it has only been in the last two or three years that their paths have fully converged, offering system developers both a rich and flexible environment in which to work.

Indeed, the melding of hypermedia and expert systems into the broader class of intelligent system applications has also brought attention to the fact that often no one technology will completely solve a given problem, so the need to integrate diverse technologies within a single application is both common and necessary. When looked at from a librarian's perspective, this combination of technologies is quite attractive as it leads to overall increases in productivity relating to information retrieval and management. In fact, when hypermedia and expert systems technologies are merged, a synergistic effect is realized, offering a richer application than could have been achieved with either technology alone. And it is this integral relationship that we focus on here as we explore the possibilities for integrating hypermedia and expert systems in creating intelligent system applications.

Intelligent computer applications attempt to emulate the human thinking process, and can therefore serve as an extension of our creative and problem-solving abilities. More specifically, intelligent systems represent a combination of technologies that attempt to parallel or replicate human behavior within specific and narrowly defined contexts. These technologies have their basis, mostly, in artificial intelligence research and development. To facilitate a better understanding of the nature of intelligent systems, we begin with the general goals and objectives of artificial intelligence (AI).

ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEMS

According to R.J. Brachman, a pioneer in the AI community, "A widely recognized goal of artificial intelligence is the creation of artifacts (usually software programs) that can emulate humans in their ability to reason symbolically, as exemplified in typical AI domains such as planning, natural language understanding, diagnosis, and tutoring. Currently most of this work is predicated on the belief that intelligent systems can be constructed from explicit, declarative knowledge bases, which in turn are operated on by general, formal reasoning mechanisms. This fundamental hypothesis of AI means that knowledge representation and reasoning--the study of formal ways of extracting information from symbolically represented knowledge--is of central importance to the field" [Brachman 1988].

Brachman's description of AI relates to the definition of intelligent systems in two ways. First, it stresses knowledge representation and reasoning at the heart of any system that reflects intelligence. Moreover, it suggests that the only way such systems can behave in this manner is if they contain formal mechanisms for representing knowledge and employing inference techniques that model conventional computationally-based systems.

For example, if an intelligent system is going to troubleshoot a telephone network switching unit, an automobile's fuel injection system, or a faulty hydraulic pump, it must first work from a body of experience and information indigenous to the domain (knowledge representation). Then it can employ a diagnostic method (based on inference) to proceed from known symptoms (facts) to probable causes and corrective measures (expert advice). Central to this type of intelligent activity is the ability not only to work logically but to access and synthesize discrete pieces of information in creating a new understanding of the problem situation and its possible resolution. This definition and elementary example of artificial intelligence technology points to the need to distinguish intelligent systems from conventional computer programs.

INTELLIGENT SYSTEMS AND CONVENTIONAL PROGRAMS

The behavior and attributes of an intelligent system distinguish it from conventional computer programs. Traditional computer applications, such as databases, spreadsheets, graphics programs, and text processing programs, are fundamentally time-saving tools that have replaced manual approaches to tasks such as calculating, sorting, typing, drawing, and so on. They do not attempt to replicate human activities such as problem-solving, diagnosis, and planning. Further, such programs simply employ algorithms and exhibit no intelligence per se. These algorithms typically create one solution path, require a complete set of data, and use a predictable set of steps defined by the programmer. It could be argued that a computer is acting intelligently when it performs a computation or a comparison. This definition of intelligent behavior, however, is too broad to be of much value, since here the computer is not using knowledge or inference to reach a result, but rather employing a prescribed sequence of steps that do not vary even if environmental conditions change.

Intelligent systems, in comparison, are more flexible and adaptive in that they draw on knowledge and the power of association and inference to steer the direction of a running program toward useful results. They do so by dealing effectively with "the complex interaction of many factors that must be considered as a whole, rather than as a series of steps" [Scown 1985], a process often referred to as "symbolic processing." Scown points out that AI-based programs can manipulate not only these symbols but govern the relationships among the symbols, which can, in turn, represent real-world entities. That is, unlike conventional programs which manipulate variables whose values are known, intelligent systems can manipulate symbols independent of their values. They do so by having rules within the system that govern or manipulate the relationships among the symbols. Unlike conventional programs, intelligent systems can work with incomplete or unknown data and still reach a useful result. In fact, Scown suggests that a system that is only 30-50 percent complete can still be quite useful as a prototype, whereas this is not the case with any conventional program.

Because intelligent systems can manipulate symbols that represent real-world entities, they are capable of working with knowledge as well. To understand this principle, we must distinguish between data, information, and knowledge. As Scown points out,

"We can think of data as any value available to the system for processing. Information can be described as data that has been selected and organized for a particular purpose. Knowledge, in the realm of artificial intelligence, is information structured in a way that brings out and exploits the relationships among the pieces of data. The distinctive aspect of the AI approach is the emphasis on the storage and manipulation of the relationships among symbols" [Scown 1985].

So the key factors in intelligent systems are

(1) the ability to use knowledge to perform certain tasks or solve problems, and

(2) the capacity to exploit the powers of association and inference in attempting to deal with complex problems that resemble the real world. These primary characteristics are helpful in defining intelligent systems because they suggest not only how they might behave but point to the mechanisms and techniques they usually contain.

THE ROLE OF INTELLIGENT SYSTEMS

Among our intelligent activities as humans is the ability to store and retrieve vast amounts of information efficiently, to solve complex problems or reach decisions, and to connect our thoughts and ideas in non-linear, associative ways. Central to this kind of behavior is not only our complex organizational skills but our ability to adapt or modify our behavior based on reason and employ several unique skills given the situation at hand.

For computer systems to be "intelligent," they must possess at least a subset of these abilities as they model specific human-related tasks. Moreover, intelligent systems need not act as independent agents, replacing human experts in a given situation. Rather, they can function as intelligent assistants, augmenting or supplementing human expertise while increasing productivity. In short, intelligent systems behave logically, solve complex problems, are responsive and adaptive, provide non-linear program navigation, make effective use of existing information, are user-friendly and highly interactive.

Looked at collectively, the characteristics listed above are a tall order for any intelligent system. Indeed, if such systems were based on common-sense knowledge and used in broad application areas, they would surely provide limited results. However, when applied in a narrow field or domain, intelligent systems can be very effective and exhibit many of these intelligent abilities.

THE INTEGRATION OF HYPERMEDIA AND EXPERT SYSTEMS

Of all the essential characteristics of an intelligent system discussed earlier, knowledge representation, inference, and non-linear association of information are the most critical to intelligent systems as they have been defined in this paper. Unfortunately, no single information technology or application program can integrate these functions well. However, when integrated within a single application or used with existing programs, hypermedia and expert systems offer a rich environment for creating software applications that can indeed behave intelligently. They do so by combining the problem-solving, associative, or expressive powers of humans at work. Basically, expert systems are software programs that use knowledge and inference to simulate the performance of a human expert in a narrow field or domain. They are particularly useful to augment problem-solving or decision-making. Hypermedia, in contrast, provides a vehicle for intuitive, non-linear access to information and program navigation that more realistically resembles intelligent behavior.

When combined within an intelligent system or application program, expert systems and hypermedia technologies have a synergistic relationship, whereby their combined strength is more than the simple sum of their individual capabilities. For this synergy to occur, however, the two technologies must be working in tandem, that is effectively linked in some way within the application program. Most often the application itself will drive the degree and type of integration between the two technologies and define the type of communication between the expert system and hypermedia components.

WHAT IS AN EXPERT SYSTEM?

Recall that the field of artificial intelligence (AI) concerns devising ways of programming a computer to act intelligently. Put another way, when a computer performs a task simulating human behavior, it is exhibiting artificial intelligence. Speech recognition, game playing, computer vision, robotics, and natural language processing are all activities that demonstrate artificial intelligence.

Another fundamentally intelligent activity is decision making. The ability to analyze a situation, determine possible responses and, from these, to choose the most appropriate action is quintessentially intelligent. When individuals become highly skilled at making decisions in a particular area, they earn the title "expert." When a computer program can simulate the decision making ability of an expert, that software exemplifies an expert system. Thus, a plausible definition of an expert system might be as follows:

An expert system is software which simulates the performance of a human expert in a specific, usually quite narrow, domain.

As we shall soon see, expert systems are useful in diverse fields including banking, commerce, education, humanities, and defense. Given a 30% annual rate of growth of the expert systems market, analysts expect that in 1990 expert systems will represent a \$2 billion market. The proliferation of such systems is nothing less than remarkable and truly indicates that artificial intelligence, once considered to be only the playchild of imaginative researchers and their graduate students, has now achieved widespread use and respectability. Moreover, many concrete benefits have accounted for the recent popularity and surge of expert systems, as indicated in the examples that follow.

BENEFITS OF EXPERT SYSTEMS

Expert Systems can save time.

Expert systems can often save time, especially in diagnostic situations. For example, Wendy's installed an expert system aimed at troubleshooting its hamburger fryers across the country. This hotline service now embodies a core of expertise that can be employed instantaneously anywhere a Wendy's is located, saving a great deal of time by not having to go through the trial-and-error approach usually associated with limited expertise.

Expert systems can increase revenue.

Expert systems can increase revenue in a variety of business situations. For example, prior to installing an expert system to help process orders, the IBM Corporation in Burlington relied strictly on the expertise of its employees. Though well trained and competent, the employees required significant time to consider the orders they were receiving; time spent in this manner translated into fewer orders being processed. Since using an expert system to help its employees in this task, the company has increased revenues by as much as \$8 to \$10 million.

Expert systems can cut costs.

In most production, manufacturing, or installation situations expert systems can reduce costs. For example, Digital Equipment Corporation estimates that its XCON (eXpert CONFIGurer) system results in savings of \$25 million per year. IBM's DEFT system (Diagnostic Expert Final Test) saves the corporation an estimated \$12 million annually by diagnosing problems during the final testing of the disk drives of its mainframe systems.

Expert systems can preserve endangered knowledge.

By capturing and distributing expertise in a narrow, but critical, domain, expert systems can preserve endangered knowledge. For example, motivated by the impending retirement of several of its top tool-design engineers, Boeing Aircraft Corporation set out to capture their expertise in an expert system and uses the system to train the younger, less experienced engineers. This project was so successful that Boeing now operates its own Artificial Intelligence Center and routinely uses expert systems on space station design, as well as on helicopter and airplane troubleshooting.

Expert systems can propagate knowledge.

Expert systems are also good at helping to propagate knowledge. For example, when in July, 1988, the United Nations' Food and Agriculture Organization identified as a high priority the enhancement of information flow and critical decision-making worldwide, it turned to intelligent systems technology to help solve its problem. The result of this decision is reflected in REGIS, an intelligent system that combines expert system and hypermedia technologies.

Expert systems can improve consistency.

By distributing a large body of common expertise, expert systems can improve consistency. For instance, LDS is an expert system developed by the Rand Corporation to assist legal experts in settling product liability cases by calculating defendant liability, case worth, and equitable settlement amount. With its expertise derived from formal legal doctrine as well as informal principles and strategies of attorneys and claim adjusters, LDS calculates the value of the case by analyzing the effect of loss, liability, responsibility, context, and other special subjective considerations, and assures that any attorney in a firm using the system will receive consistent advice [Waterman 1986].

Expert systems can train.

Because they reflect expertise and are often procedurally guided, expert systems are useful in training situations. For example, the Department of Ophthalmology at the University of Maryland Hospital is developing an expert system whose purpose is to train residents in identifying ocular trauma. Linked to images stored on a video medium, the system will answer questions posed by residents and then query them on the diagnosis of the trauma. The benefits of this system over time will include consistent, top-level training for students, on-line examinations, and improved time management for faculty.

Expert systems can integrate with other software.

Although expert systems can stand alone in certain applications, they can often be easily integrated with other software, such as spreadsheet or database applications. For example, the IR-NLI system, developed at the University of Udine in Italy, includes an expert system which provides non-technical users with a natural language interface to the information retrieval services offered by online databases. The system acts as a front-end to several databases and decides which will be the most appropriate for answering the user's requests. IR-NLI combines the expertise of a professional intermediary for online searching with the capability for understanding natural language and carrying out a dialog with the user [Waterman 1986].

Expert system shells reduce development time.

Due to the fairly recent introduction of expert system building tools or "shells," expert systems no longer require 20 man-years to develop as some did in the early days of the technology. Such tools lead a developer through the process of incorporating knowledge into an expert system. A shell essentially facilitates expert system development by reducing the burden of representing knowledge in machine form. Shells are currently available for all computer systems ranging from mainframes to personal computers and many are priced between \$200 and \$1000. In addition to making expert system technology available to average desktop computer user, shells have not only significantly reduced the development time of expert systems, but allow applications to be built in less time than with conventional AI languages such as LISP or PROLOG. More than any other factor, this savings in development time has been responsible for the rapid proliferation of expert systems technology in the 1990s.

TYPICAL EXPERT SYSTEM APPLICATIONS

Just as word processing, spreadsheet and database programs have found a multitude of applications, so too expert systems can address a wide variety of tasks. The historic applications described in this section, by no means exhaustive, illustrate just how diverse is the arena of expert system technology, and suggest the vast potential for intelligent systems in general. The sample systems described below highlight some specific areas where expert systems have been successfully deployed.

Diagnosis.

National Cash Register (NCR) of Dayton, Ohio, employs an expert system it calls KESCOM/pm to enable its analysts to more effectively diagnose the communications problems of its data center customers. The system leads the analyst through the thought process of communications experts when a bank calls to report a communications difficulty, resulting in a quick and consistent determination of the problem. "We have 23,000 terminals coming into us through 4,100 telephone lines," says Greg Hanson, marketing director for financial systems. "If there's a problem anywhere--the terminal, the cable, the phone company, etc.--the high level people taking the calls can quickly solve it" [Computers in Banking 1989].

Classification.

While interviewing a patient suspected of having schizophrenia or some other schizophrenic disorder, a psychiatrist asks certain questions and makes certain observations intended to reveal the nature of the patient's symptoms. In fact, many psychiatrists have their personalized approach to this interview. However, the Diagnostic and Statistics Manual IV, the definitive handbook of psychiatry, lists criteria that clinicians routinely check during such interviews and indicates the diagnosis based on these criteria. To systematize the diagnosis, the Maryland Psychiatric Research Center (MPRC) prototyped an expert system in 1988 that essentially contains the expertise of the Diagnostic and Statistics Manual IV. When the expert system assists with the interview, a psychiatrist can classify the patient's disorder in a manner consistent with the guidelines of the manual. This approach removes the idiosyncrasies that often creep into interviews and achieves a more dependable classification.

Prediction.

ADEPT is an expert system developed by TRW for the military which aids battlefield assessment analysts by providing tactical interpretations of intelligence sensor reports. The system uses these reports to generate a display of combat locations on the battlefield. Military knowledge and expertise are encoded as rules concerning how and why enemy forces operate and the tactical significance of situation interpretations [Waterman 1986].

Scheduling.

United Airlines, like other carriers in the field, needs to schedule its gate assignments optimally, especially at busy airports such as Denver's Stapleton or Chicago's O'Hare, where United routinely makes 400 assignments to 50 gates within a single day. In an attempt to cope with this complex problem, United deployed the well-known Gate Assignment Decision System, an expert system based on the TI Explorer, a special-purpose LISP-based AI workstation. According to a recent AI Expert article, "TI used a half-dozen experts from United's gate-operations team to create the knowledge base for GADS" [Newquist, 1990]. The net outcome of using GADS is that United personnel are freed up to focus on more critical assignments. The system reportedly took only ten months to build and is now used at two of the busiest airports in the nation. GADS is also linked to the company's mainframe system, Unimatic, which maintains all other flight information and can now feed data directly to the GADS system to be used in the automated scheduling process.

Decision Support.

When a credit card corporation receives a request for an unusual expenditure, someone has to decide whether or not to approve the request. A run of unusual transactions may indicate the cardholder is on a buying spree or may suggest that the card is in unauthorized hands. American Express has devised an expert system to assist in this very situation. Containing the expertise of American Express' own analysts, this system either approves or disapproves a credit line request based on such factors as amount of the request and history of the cardholder's buying and paying habits.

Configuration.

An example of a configuration system is Z-EXPERT, developed in 1987 for Zenith Data Systems (ZDS). Z-EXPERT queries potential PC buyers concerning, among other factors, their intended areas of application, their level of expertise in hardware and software, and the kinds of system peripherals they may have in mind. After digesting the users' responses to its questions, Z-EXPERT produces first a generic description of a suitable configuration and then recommends the Zenith Data Systems bundle that best matches this description and fits the buyer's needs. ZDS has found that supplying college campuses with Z-EXPERT assures that its student representatives on campus offer reliable, consistent advice to students thinking about purchasing a ZDS computer system.

Expert System Integration with Data Processing.

Effective expert systems usually interact well with previously acquired data collections. MDX, developed at Ohio State University, is such a system. MDX diagnoses the existence and cause of the liver syndrome known as "cholestasis." It bases its diagnosis on patient history, signs, symptoms and clinical data. Access to the database of patient records is managed by another expert system called PATREC. PATREC accepts data from the user, stores it appropriately, provides a query language for question answering, prepares summary reports, and makes suggestions helpful in diagnosis. In this way, MDX and PATREC work together to transform the collection of facts contained in a database into useful and practical knowledge and information [Waterman 1986].

Information Retrieval.

The Goucher College Biographical Reference Advisor is a PC-based expert system built by the authors to identify appropriate biographical reference sources. The system works during all hours the library is open; the two Goucher College reference librarians do not. Using this system, students can take advantage of the reference librarians' expertise even when the librarians are not physically present.

But even when the librarians are present, the system is running and accommodates the majority of routine queries which students would otherwise pose to librarians. This enables the reference librarians to devote time to the more interesting aspects of their jobs and to help students with more difficult problems. Looked at from this perspective, the Goucher College Biographical Reference Advisor increases the productivity of the library staff.

Should there come a time when another position is added to the reference staff, the system stands ready to introduce the new member to the biographical reference collection of the library and to familiarize that person with the operating mode of the current staff.

Diagnosis, classification, prediction, scheduling, decision support, configuration, integration with database systems, and information retrieval represent only a few of the major areas where expert systems have had an impact. For more detailed accounts of intelligent system application areas, consult trade journals such as AI Expert, PC AI, and the Spang Robinson Report.

WHAT IS HYPERMEDIA?

Basically, hypermedia is an information management tool that links text, graphics, sound, or other types of media in an associative way. In doing so, it allows users of a system to navigate through information in non-linear fashion. Moreover, because hypermedia has the potential to simulate the human ability to organize and retrieve information by referential links, the technology is also capable of providing a form of a relational object-oriented network that can extend knowledge representation within an intelligent system application. With this kind of capability, hypermedia can play a major role in intelligent systems development through its ability to access information or control program navigation in a non-linear way. By non-linear we mean moving or jumping from one point in the program to another based on both the user's needs and the patterns of relationships that are explicitly defined by the developer. Unlike a book, where pages are ordered sequentially, and routinely read in a linear fashion, hypermedia information can represent a collection of interconnected files that contain text and graphics linked into a web or network. Users are free to progress or navigate through a system using any number of non-linear pathways for which links have been established by the designer. Distinctions between the terms "hypermedia" and "hypertext" have become somewhat blurred in recent years, but the principles have remained the same. We prefer to use the term "hypermedia" since it is more inclusive and because knowledge can be expressed in text, graphics, and other media as well. Although hypermedia is an extremely powerful tool for interconnecting information in intuitive ways, and thereby augmenting human intelligence, it is not by itself capable of rendering intelligent applications. As an organizational and information retrieval tool, hypermedia does provide a highly flexible context for representing knowledge, but it lacks the

reasoning or inference ability to generate a truly "intelligent system" found in expert systems. In the following sections we explore the benefits of hypermedia and reveal key areas where the technology has been successfully used.

BENEFITS OF HYPERMEDIA

Hypermedia saves time.

Hypermedia applications can often save time by allowing users to browse through information without having to pay attention to detail. In this sense, the technology offers a quick way of retrieving linked or cross-referenced information without stepping users through a series of intermediate menus. In essence, hypermedia offers the ability for users to have direct manipulation of the information at hand. The net result is a savings of time by making more efficient the task of pinpointing and retrieving relevant information.

The HyperLex system, developed at the Pittsburgh-based law firm of Reed, Smith, Shaw & McClay, offers a good example of this hypermedia feature in action [Hypertext '89, 1989]. HyperLex was designed to help attorneys with patent applications, along with other types of legal activities. One of the primary aims of the HyperLex system in this area was to cut down the amount of time it takes to identify relevant "prior art" (published works of any kind) before beginning to process a new patent application. Using hypermedia access to the HyperLex database that contains inventions and their corresponding descriptions, attorneys using the HyperLex system can now more quickly identify similar patents that are already in place. Moreover, new patent applications can also be immediately linked and cross-referenced online.

Hypermedia aids in discovery.

Hypermedia can also aid in the discovery of new ideas or relevant information by indicating links to information that might not have been originally sought. A good example of this type of hypermedia-aided discovery is SuperBook-a prototype system developed at Bell Communications Research [Hypertext '87, 1987]. SuperBook automatically transforms online text documents into enhanced documents that contain a table of contents, index, and concordance. Once established, these meta-text elements help to locate information in a layered fashion, and provide the opportunity to view every occurrence of a word by either keyword or boolean search function. In this way, the hyperdocument that is created fosters a greater degree of exploration of the text than was possible before the preprocessing and hypertext indexing was accomplished.

Hypermedia Offer Better User Control/Navigation.

Among the many benefits of hypermedia, the ability to offer better user navigation or control of a system accounts for most of the technology's popularity to date. The reasons for this are simple. Until hypermedia appeared, program control was always in the domain of the developer. Menus, hierarchies, and linear sequences of questions or directions kept users on course throughout a working session. Usually the only flexibility offered was backing up a screen or returning to the beginning of the program. Hypermedia, however, offers non-linear access to information and program control that opens up avenues not only for exploration but for user-defined system navigation. A good example of this feature is the hypertext-based documentation index that comes with the PC-Browse text search program from QuickSoft, Inc. Though QuickSoft supplies a full version of the hardcopy PC-Browse manual online with its shareware product, users will find that the hypertext index that is linked to an abbreviated online manual will provide a more direct means of accessing critical information than that found by reading the full manual in linear fashion. In addition, once the hypertext manual is invoked, users can then vary the degree of help they get by choosing only those additional hypertext words that interest them.

Hypermedia Provides a Collaborative Work Environment.

Hypermedia can also promote a collaborative work environment by allowing people working on individual pieces of text or graphical information to link together in a larger hypermedia network. An example of this hypermedia feature is the Virtual Notebook System (VNS), developed at the Baylor College of Medicine in Houston, Texas [Hypertext '89, 1989]. The VNS facilitates information acquisition, sharing, and management within those scientific groups engaged in both basic and clinical research. The intent of the VNS was to foster collaboration across a heterogeneous computing environment. Ultimately the VNS was implemented in the Sybase relational database system and employed an X Windows interface that runs on multiple platforms. In essence, the VNS serves as a scientific notebook where research notes, e-mail, images, graphics, and other types of objects can be interconnected within a scholarly network. The VNS notebooks are linked into a web-like configuration, thus allowing users to work with more than one notebook at a time and to freely share information with others across the network. Notebook pages can contain links to other pages or images in the same notebook, to other notebooks in the working group, or to any other notebook within the hypertext web. Security is also maintained so that notebook access can be limited to work groups or shared college-wide.

Hypermedia Helps to Limit the Knowledge Domain.

While hypermedia by itself is not capable of creating intelligent applications, it can help to limit the overall domain of a working knowledge base by revealing how certain system components or objects are related to each other. In this sense, hypermedia extends knowledge representation by drawing upon patterns of inheritance or exploiting other types of relationships, which include is a part of, is more general than, leads to, is similar to, has a, and other relationships. In essence, instead of leading users through a series of questions in an expert system module, hypermedia lets them proceed directly to the area of need or concern. Using hypermedia in this capacity is a complex affair, but it reveals the highly complementary nature of hypermedia and expert system technologies.

TYPICAL HYPERMEDIA APPLICATIONS

Training/Education.

Hypermedia is well suited to applications that include training or education, primarily because of the flexibility that the technology offers over conventional computer-assisted instruction. This flexibility is reflected in a non-linear access to information and a transfer of program control from the developer to the end user. Unlike traditional CAI programs, hypermedia can be more adaptive overall, offering a more effective program navigation that is geared to the needs and interests of the end user. A second benefit to using hypermedia in a training/education environment is its ability to foster greater exploration of relevant, but perhaps tangential, information.

Good examples of this use of hypermedia abound in the medical profession [Schneiderman, 1989]. For example, the Dynamic Medical Handbook project at the Washington University School of Medicine offers researchers and teachers a hypermedia technique for managing medical information related to diagnosis. A drug information hypermedia database is being developed at the Johns Hopkins Hospital to replace standard drug reference books. And Explorer-1 is another hypermedia project developed at the Harvard Medical School in the area of diagnosis and pathophysiology. These hypermedia-based systems and countless others in the field of specialized education offer instructors at all levels the ability to link creatively diverse sources of information to a single problem or issue.

Illustration/Annotation.

By virtue of its supporting multiple media, hypermedia offers a perfect means of adding annotation, illustration, animation, video, and sound support to textual information within an intelligent system. In the Apple Hypercard or IBM Windows environments, for example, a hypermedia system that exploits these graphical user interfaces can link textual information to any number of graphic images, sounds, or even full motion video sequences, thus offering new dimensions to the presentation and dissemination of multi-media information. A good example of this hypermedia functionality is found in the Linnaeus system, which aids scientists in the taxonomic classification of aquatic life [Estep, 1989]. In essence, Linnaeus (named after 18th century naturalist Carolus Linnaeus who invented our current approach to taxonomy) uses a number of identification "keys" that help scientists classify specimens according to type. Since this is a complex process, its hypermedia dimension offers users rapid access to written and pictorial information that is annotational in nature, including explanations of unfamiliar terms. Graphic images that accompany the taxonomies are also included, and such a system could, over time, be coupled to a video source where marine animals could be viewed in their natural habitats. Thus, systems like Linnaeus demonstrate that hypermedia is indeed a powerful tool for bringing diverse information in a variety of media together for the purpose of illustration and annotation.

Online Documentation.

Because hypermedia offers both a mix of text and graphics, it is also a perfect medium for online documentation, and in many ways offers similar benefits as when it is used in a training/education environment. That is, hypermedia's non-linear access to information and its transfer of program control to the end user make it perfect for reading online manuals at various levels with great efficiency. Before a hypermedia approach to system documentation, online manuals were almost always either hierarchically arranged or indexed by topic, with very little cross-referencing capability. But now hypermedia offers a way for users to "thread" their way through online manuals based on the context and their specific needs. A good example of hypermedia-based online documentation comes with Spinrite, a commercial product intended to keep hard disks running at optimal performance. To fully understand how Spinrite works, users must first come to grips with much terminology related to hard disk configuration and maintenance. So Spinrite offers a hypermedia-based online manual that lets users determine the desired level of background information they might need by clicking onto highlighted words. The software

vendor even gets playful in this endeavor by prodding users to follow a hypermedia thread to its end just to instill more knowledge about the inner workings of a hard disk.

Information Access.

As information becomes more and more plentiful, it is no wonder that we must seek alternative ways to retrieve it quickly. Fast, extensive indexing techniques and text preprocessing are two ways of getting at this problem from a conventional point of view. That is, the better the index, the easier it is to find things. Even these helpful technologies, however, cannot augment a human search task as well as hypermedia with its non-linear access to information and its abundance of navigational cues. A good example of using hypermedia this way is Zenith Data System's InfoXpert, an intelligent system application whose purpose is to recommend an appropriate computer system configuration to a potential customer. By employing both expert systems and hypermedia technologies, InfoXpert offers direct, non-linear access to megabytes of ZDS information concerning product configurations, system options, technical setups, and demonstration software. For example, once InfoXpert's expert system recommends a particularly configured ZDS product, users can then navigate through all of the information pertaining to that system.

INTELLIGENT SYSTEM MODELS

Three basic models for intelligent systems exist. The first depends primarily on an expert system strategy for increasing human productivity or providing intelligent assistance. To reach such a goal effectively, developers must pay attention to the nature of the inherent expert system components, and the way these elements integrate with hypermedia to create a fully functional intelligent system application.

Concerning the expert system component, developers need to be aware of the following items relating to the development of the expert system component:

- (1) the nature of the problem and the type of knowledge representation and inferencing techniques that should be used,
- (2) the knowledge acquisition techniques that apply,
- and
- (3) the role uncertainty might play within the system.

These components can provide a more effective user interface, a better way of linking, locating, and retrieving critical information, and a way of explaining the system's reasoning.

The second intelligent system design is based primarily on hypermedia but includes an embedded expert system component. Such systems usually originate with the text of original documents or a collection of graphics. These information sources often create the backbone structure of the system, while the expert system component provides specialized local functions. Hypermedia-based intelligent systems have great potential because of the amount of knowledge that exists today in the form of raw text. In fact, some developers argue that the next generation of AI-based applications will be "text-based," rather than "knowledge-based" in the form of rules, for such systems can be built much more rapidly by side-stepping much of the laborious knowledge engineering process. It is because of this potential importance that we have included an intelligent system model based on hypermedia.

The third intelligent system design illustrates an intelligent system built primarily around existing databases and information sources. This information is typically in the form of structured text or data, spreadsheets, graphics, or other programs, which are accessed directly through file input/output operations. By being linked to an intelligent system, this information can produce a worthwhile or leveraging effect, as in retrieving critical information from a text file or database to be applied to a diagnostic, problem-solving, or decision-making situation. When developers integrate databases with an intelligent system, the task is a challenging but highly rewarding endeavor. As Stephen Schur puts it in an AI Expert article,

"Today, for the most part, database systems and expert systems live in separate worlds. For every company that has implemented an expert system to date, dozens more are still assessing the technology. Many managers glimpse the potential payoffs from combining these two technologies, but unless a convenient way is found for an expert system to interact with the corporate data base, implementation of systems to reap these benefits will be tortuous and slow. Some of the major obstacles to building intelligent databases are structural. Data base management systems (DBMSs) stress syntax over semantics (structure over meaning), while in the expert systems world just the opposite is true" [Schur 1988]. Though this was the case in early 1988, the situation has changed measurably, and now intelligent systems are commonly integrated with databases and existing information sources. The reason for this shift toward integration stems primarily from the types of tools that are now available that include techniques for

transforming existing text into hypermedia, establishing hooks to specially formatted database files, or providing complex database bridges that allow for a greater degree of integration with existing information.

LEVERAGING ORGANIZATIONAL INFORMATION

On one end of the integration spectrum, intelligent systems can provide effective front ends or back ends to information sources and database programs, where text files, graphics, or data are intelligently manipulated. Such systems usually involve information-intensive applications that have less error, better data integrity, or better reporting functions. More complex integration strategies, however, involve using intelligent systems to leverage existing database applications, resulting in a transformation of data into knowledge through induction techniques, or improvement of database organization and functionality through the integration of expert systems and hypermedia technologies.

In these more complex integration cases, it may be possible, for example, to map intelligent system components, such as objects, rules, and hypermedia nodes, to database entities as they are expressed in tables, indexes, and individual records. In fact, some of the more complex intelligent system development tools on the market offer the possibility for directly achieving this type of database integration, while other tools simply offer "hooks" to specially formatted database files.

Because of this basic division in how databases and other types of existing information combine with various intelligent system development tools on the market, it is useful to break down the integration process of intelligent systems into two categories: integration at interface level and integration at the organizational/functional level.

Integration at the Interface Level.

Intelligent system integration with existing information and databases occurring at the interface level typically consists of ASCII file read and write commands, or hooks within development tools that open database files and manipulate specific information stored in system records. These hooks are usually represented by special commands or system calls, which can either be initiated by expert system elements (such as rules), or fired from hypermedia nodes.

Many development tools include spreadsheet and database hooks that have system names or commands similar to those found in common commercial packages such as Lotus 1.2.3 and dBASE. For example, a tool may implement a dBASE hook with statements such as GET, PUT, SEEK, APPEND, and so on. The intent of these hooks is to interface the intelligent system application to a database system or specially-formatted file to use the stored data in some predetermined way. Most often, when programs extract data in this way, they need to establish the value for factors or variables within the working intelligent system.

Because the typical interface between an intelligent system and existing information is usually achieved through file input/output operations, this integration method is often slow, as it is primarily dependent on the amount of available system memory and the speed of hard disk operation. Moreover, database hooks and other information access devices often search files sequentially and do not take advantage of specialized indexes or database query languages (such as SQL). Thus, with this approach to integration, the time to access a database or specially-formatted file in a real-time setting may be unacceptable, and an alternative method of integration would be desirable, as described in the following section.

Integration at the Organizational/Functional Level.

One way in which developers can link intelligent systems more effectively to databases and existing information sources is to exploit hypermedia and expert system functions for specialized tasks. For example, by drawing upon existing or inherent organizational schemes, developers can transform existing text files into hypermedia documents that are much more useful and navigable than traditional online texts that are hierarchically organized and presented. At other times when diagnostic, problem-solving, and configuration situations present themselves, developers can extract procedural knowledge from existing technical reference manuals for embedding within an expert system component as production rules. In each of these instances, the integration level goes well beyond the interface level because the program can leverage existing information into a new functional area.

In cases that involve databases, sometimes developers opt for induction techniques to transform data into knowledge by discovering hidden relationships among the data elements. Once discovered, these relationships can then be expressed in a set of rules applicable to new situations, demonstrating once again that existing information can be leveraged into a new use or applicability. In other database applications a standard

Structured Query Language (SQL) approach can sometimes fully mesh a database with intelligent system components. Here, an intelligent system can generate a series of SQL statements at run-time that will be used to locate and extract data from a DBMS.

The methods by which these specialized queries are generated can be dependent upon the user interaction with the system or on the type of information the inference mechanism requires to conduct its work. With this approach the architecture of the intelligent system is more tightly integrated with the database management system and the SQL code can speed up the data look-up process significantly. Furthermore, when the SQL coding meshes with rules, objects, or hypermedia networks in the knowledge representation scheme, the integration strategy goes beyond the interface approach because the two technologies are no longer working independently, but combine to perform a given task.

Despite the benefits of induction techniques and SQL dependent interfaces, more complex integration tasks still require the need to more fully integrate the intelligent systems with the database application at the organizational/functional level. In such cases, higher speed tools and specialized database "bridges" become necessary. In essence, this type of integration requires the intelligent system and database components to link at the "object" level, where the agents within the intelligent system have counterparts in the DBMS and can communicate directly with the database through SQL. Though they have been defined in various ways by many developers, objects can be thought of as complex entities within the intelligent system application that can represent both database and expert system components or functions. When these entities or objects are tabularized within both the database system and intelligent system components, there exists the possibility for a direct one-to-one mapping process, creating a tightly integrated intelligent database application.

Once these objects are directly mapped, developers can use them to trigger activities within the intelligent system application at run-time. This causes a subsequent action or event to occur in which data is extracted as several rules fire concurrently to reach a specific conclusion or result.

CONCLUSION

In the previous discussion, we have focused on the benefits of hypermedia and expert systems and especially on their integration in creating intelligent system applications. We believe that current directions in information science toward using hypermedia and expert system technologies as a performance-enhancing technology within traditional applications indicates continuing widespread adoption of intelligent systems within libraries. We believe this to be the case because combining hypermedia and expert systems technologies can supply embedded AI-based functionality within existing applications to leverage information to new usefulness. In fact, according to some industry experts, "Embedded AI will become so useful that, by 1998 or 1999, a vendor will be unable to successfully sell a product without a far greater form of embedded artificial intelligence than we have today" [Leininger 1988]. In the library field, this is already beginning to be the case. However, for AI-based intelligent systems to achieve this goal they must take into account existing real-world needs for information processing. Moreover, they must encompass a broader range of functions than expert systems technology currently does alone. Two such functions are non-linear navigation through extensively linked information (in both graphical and text form) and intelligent location and retrieval of information from common sources, such as online database systems. We believe that by combining expert systems with hypermedia we can go a long way toward achieving this goal.

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THE MEDINDEX: (MEDICAL INDEXING EXPERT) PROJECT
AT NLM

BY

SUSANNE M. HUMPHREY

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by

SUSANNE M. HUMPHREY

National Library of Medicine, Bethesda, MD 20894
Internet: Humphrey@ihc.nlm.nih.gov

For about twenty-five years the National Library of Medicine (NLM) has provided publicly-available data bases that index biomedical literature and are searchable in computerized retrieval systems. Although the Medical Subject Headings (Mesh!) indexing thesaurus is available in machine-readable form, indexers rely primarily on the printed form, as well as printed manuals and other indexing tools, for declarative (factual) and procedural knowledge relative to indexing.

At NLM's Lister Hill National Center for Biomedical Communications (LHNCBC) we are searching for ways to improve access to biomedical information. One of our research projects is to develop and test the MedIndex (Medical Indexing Expert) System, an interactive knowledge-based prototype for computer-assisted indexing of the MEDLINE® data base. By encoding the indexing scheme in a knowledge base (KB), and designing a system for indexers to use in a work station environment, the objective of this project is to facilitate "expert indexing" that is performed at NLM.

MedIndex is written in a frame language, a type of object-oriented language where objects, known as frames are used for representing concepts. In a frame, a concept (the frame name) may be described as a list of pairs of slots and values, where a slot is a relation, and a value is another frame name that completes the relationship. For example, Heart LOCATION VALUE Thorax describes the heart (frame) in terms of its location (slot) in the thorax (value). Most frames contain a number of slots (up to eight slots per frame in the current prototype). Determining these relations, which do not exist as such in Mesh or any other suitable thesaurus, is part of the research of developing the KP.

Frame descriptions contain other types of declarative knowledge having to do with values. For example, a slot might not have an associated value, but rather specify a range of values that make sense for that slot, or it may have default values which may be over-ridden by users in an interactive environment. In addition, frame descriptions have procedural knowledge. Specifically in MedIndex, slots have associated executable procedures that enable the system to assist indexers interactively, as described further on.

Slots are subdivided by facets, which specify types of knowledge associated with a slot. For example, VALUE in the above example of the Heart frame is the name of a facet that introduces actual values. However, in a Lymph Node frame, where different locations are possible, a RESTRICTIONS facet would introduce a list of body areas where lymph nodes might be located, such as (Axilla Neck Pelvis). This facet contains declarative knowledge (list of body areas), but is also a procedural facet since it checks that values added to the LOCATION slot in indexing frames (explained below) are members of this restrictions list.

An important relation in the KB is known as inherits-from, which links the entire KB into a single classification. For example, Knee Injuries (INHERITS-FROM VALUE leg Injuries established this hierarchy between the higher-level frame Leg Injuries and lower-level frame Knee Injuries. Inheritance, whereby lower-level frames automatically assume descriptions of higher-level frames to which they are linked by this inherits-from relation, achieves a number of important KB functions. These include maintaining consistency of the KB, detecting redundancy in the KB, and simplifying algorithms for accessing frames based on these explicit hierarchical paths from higher-level frames to lower-level frames.

Indexers, with system guidance and help coming from the KB, create for each document indexed a set of indexing frames patterned after KB frames. Indexing frames are descriptions of instances of KB frames. These instances correspond to objects, events, procedures, and other specific descriptions as discussed in documents being indexed. The name of an indexing frame is a concatenation of its KB frame name and the unique document number of the document being indexed. Each indexing frame is linked to its corresponding KB frame by the same inherits-from relations that is used for linking frames in the KB classification. Indexing frames inherit slots from these KB frames, and since KB frames include executable procedures (indexing rules), this is how the indexing system can give help that is specific to the concept being indexed.

For example, the following shows a slot that has been filled in an indexing frame for document #86365451 which is about leg injuries. The value Angiography, entered by the indexer in response to the slot prompt PROCEDURE, indicates that this document discusses angiography (radiography of blood vessels)

for leg injuries. Also shown is the inherits-from relation between this indexing frame and the Leg Injuries frame in the knowledge base.

```
Leg Injuries 86365451
  INHERITS-FROM
    Leg Injuries
  PROCEDURE
    >Angiography
```

Indexing assistance includes slot names as prompts for indexers to consider indexable aspects of a document (PROCEDURE slot in the above example); validating indexers' input (accepting the value Angiography); prescribing or suggesting slot values based on KB rules; and hierarchical KB displays for browsing permissible values for the current slot.

The KB contains rules not only for creating and filling indexing frames, but also for generating in the background conventional MeSH indexing terms at the level of expert indexing. For example, the above simplified indexing frame would automatically generate the MeSH indexing terms Leg Injuries/RADIOGRAPHY and Angiography. This output can be used to compare the system to conventional indexing, and would provide actual MEDLINE indexing for current retrieval systems.

Recent accomplishments in the project include a KB manager designed to assist knowledge engineers in ensuring a consistent, compact, and syntactically correct KB. This software utilizes the inheritance feature of frame languages, and special scripts employing menu and cut and paste interfaces. Graphical display of hierarchies and creation of frames in batch mode are additional enhancements. New developments in the indexer interface program include detecting inconsistencies in previously-stored indexing frames; system suggestion of specific terms; retention of canceled frames for possible re-use; caching for quick access to large hierarchies; and regular-expression searching and other improvements in browsing hierarchical displays. A word-level aliasing technique has been developed to permit truncation of individual words in a term, which then would be recognized by the system as lead-in vocabulary for frame terms.

The KB is undergoing expansion in preparation for use of MedIndEx by indexers. This involves creating and editing frames using the advanced features of the KB manager, and working with test documents for which consensus indexing has been obtained from NLM's Index Section for this project.

As an experiment, the Art and Architecture Thesaurus (AAT), produced by a unit of the same name with The Getty Art History Information Program, was loaded into MedIndEx, and a demonstration prototype developed for using AAT KB in indexing a journal in this domain. Project staff prepared a 251-page technical report on MedIndEx (referenced at the end of this project description). This report, illustrated with nearly 200 figures, contains the design document, including pseudocode and detailed scenarios of system use, and the user manual for indexers.

In the coming year, project staff will continue to enhance the KB manager by extending special scripts and interfaces to automatically maintain correct syntax and consistency. A new interface to MedIndEx will be developed written in the X Windows System, which is a device--independent, multitasking windowing, and graphics system designed to operate across heterogeneous networks. This interface would be tested by running MedIndEx from a Sun running X server software and from a terminal running an X server. A working portable interface should facilitate eventual use by indexers.

Indexing frame output, which consists of a network of linked frames, would describe a document more precisely than conventional indexing. Project staff are therefore investigating frame data bases for retrieval, including developing an expert search assistant that adapts existing software to assist searchers in filling query frames. Output might be in one of two forms: SQL query statements for searching indexing frames in a relational data base, or system-generated MeSH indexing terms for use in conventional MEDLINE retrieval systems.

Experimenting with installing knowledge bases and developing demonstration prototypes in other domains will continue, as time and resources permit. Collaborations may be developed for using the KB manager, designed to be a domain-independent tool for creating and editing thesauri and knowledge bases.

The following detailed report, as described earlier, is available from NTIS: Susanne M. Humphrey and Do-Chih Chien. Then MedIndEx System: research on interactive knowledge-based indexing and knowledge management. Technical Report NLM-LHC-90-03, Bethesda, MD: National Library of Medicine, July 1990. Distributed by NTIS (Publication No. PB90-234964/AS).

ARTIFICIAL INTELLIGENCE, EXPERT SYSTEMS, AND
HYPERMEDIA AT DEFENSE TECHNICAL INFORMATION
CENTER

BY

RANDY BIXBY

ARTIFICIAL INTELLIGENCE, EXPERT SYSTEMS, AND HYPERMEDIA
AT DEFENSE TECHNICAL INFORMATION CENTER

by

RANDY BIXBY

Office of Information Systems & Technology
Defense Technical Information Center

DTIC's mission

As most of you probably know, DTIC's mission is to acquire, store, retrieve, disseminate, use and enhance technical information for R&D managers, scientists, engineers, and others. DTIC catalogs and indexes all the technical reports and work unit information summaries produced from DoD-related research; registers users authorized to receive that information; stores archival copies of the documents; reproduces paper and microfiche copies of the documents for our users; and establishes and maintains online databases for remote users and in-house searchers.

DTIC's user community

DTIC's user community is diverse and widespread, from small contractors to DoD research libraries and other government agencies all across the country and around the world. We try to provide the best service we can, and keep up with changes in our users' needs and emerging technologies.

The role of the Office of Information Services and Technology within DTIC

This is all a very large effort, requiring many people and much equipment. The Office of Information Services and Technology (DTIC-E), where I work, is always looking at new Technologies to find ways to provide information to DTIC's users, and also to make DTIC's internal functions more efficient. Among DTIC-E's projects which have recently come to fruition are the DoD Gateway Information System (DGIS), a gateway system which offers centralized access to diverse information systems; SearchMAESTRO, a menu-based search assistant; TR on CD-ROM, which provides 20 years of the Technical Reports Database with an easy-to-use interface; STILAS, the integrated library system

now installed in DTIC's Technical Library and 8 other sites across the country; and the Electronic Document System, or EDS, which will replace DTIC's current microfiche archival system with optical media. We look for new technologies which can be incorporated into our products, services, and day-to-day operations. Among the new technologies currently being examined are Artificial Intelligence, Expert Systems, and Hypermedia, which just happen to be the topics of this Military Librarians Workshop.

I'm here to tell you about some of the applications DTIC has developed in the past, And what we are working on now. At the end I'll give you a short demo of an application which I've just started developing.

Artificial Intelligence

Several years ago DTIC did a survey of current AI technology, identifying hardware and software, and looking at what other researchers were doing. This was done through literature searches, vendor presentations, and drawing on the experience and knowledge of DTIC and contractor staff.

From data gathered in this survey, it was obvious that the realm of possibilities for AI was virtually limitless, so we decided to focus our AI developments in one area. One of DTIC's goals is to increase services directly to the end user, who typically isn't a computer programmer and doesn't have a lot of time to learn all the nuances of lots of different systems with different interfaces and capabilities. So DTIC has tried to identify some end user-related areas which would benefit from the application of artificial intelligence.

Common Command Language

DTIC's first foray into artificial intelligence was a prototype version of our Common Command Language, or CCL. CCL was designed to alleviate the need for online database searchers to learn multiple command languages for different database systems. It is based on the National Information Standards Organization's Standard for Common Command Languages.

The AI-based version of CCL was written in Prolog, a relational programming language. A Prolog package was purchased for the VAX 11/780, on which CCL development work was being done. Prototypes were written for searching DROLS, DIALOG, BRS,

ORBIT, and NASA-RECON. CCL consists of knowledge bases for each database system, for user profile information, and for overall CCL functions. CCL is one module of the DoD Gateway Information System (DGIS), and interacts with other DGIS components.

When completed, CCL will be available as a DGIS menu option under the assisted searching heading. Links will be established between CCL and DGIS' Directory of Resources and the Query Builder Expert System (QBES). CCL searches may be downloaded and post-processed using the same routines as other searches performed on DGIS. Results files may be edited, deleted, moved around, printed, or sent through electronic mail.

Other applications

Other potential artificial intelligence applications have been identified within the realm of DTIC's product, service, or functional areas. These include: thesaurus integration for assistance in selecting search terms, synonyms, hierarchies, etc.; natural language interfaces for database searching and other functions; machine translation of foreign languages; numeric data query and processing system.

The list could go on and on. And the ones I've mentioned above deal only with database searching. AI has immense possibilities for other day-to-day functions within DTIC itself.

Expert Systems

DGIS offers users the capability to automatically connect to diverse online database systems, search those systems, download search results, and manipulate results into a format most useful to the user. But once the user was connected to a system, he was on his own. CCL was designed to assist users by eliminating the need to learn multiple command languages. What was still needed was assistance in building and refining the query. The Query Builder Expert System (QBES) was born.

Query Builder Expert System

QBES is being prototyped on the VAX 11/780, the DGIS development machine. It will be accomplished in phases, each of which will add more capabilities.

QBES as it currently stands consists of an interface which allows users to select various functions: They can create a query, edit it, run it, or schedule it to be run at a later time.

Queries created by the user are entered using Common Command Language commands. As each command is entered, it is verified using all of the syntax checking, command completion, and in-line help of the full Common Command Language System. This is all done transparently to the user.

The user can run the query immediately after creating it by selecting the RUN option. CCL takes care of connecting the user to the selected system, translates the commands into the host system's command language, and returns the results. A message on the QBES screen lets the user know the search is being conducted. When the search is completed, the user may choose to view the results, or store them in a file named by the user.

The user may also schedule the query to be run at a later time, even when the searcher is not present. Results from scheduled query execution are stored in a file which can be accessed by the searcher at a later time.

We envisage an individual searcher might want to make his query files accessible to other searchers. In this way, a searcher who is expert in a subject area, or who has performed a search which has had excellent results, could make his expertise available to others. These search strategies or queries would be copied into a central DGIS query file. Another searcher could then copy the query into his own directory and modify it as needed, or run it in its original form.

QBES will consist of two modes:

A non-interactive or expert mode. This mode will be virtually identical to CCL, and it will offer only the same amount of assistance, namely, syntax checking and command completion, that CCL offers. The main difference between the non-interactive query builder and CCL is the ability to build, edit, copy, or list the query offline, thus saving database connect time charges, and to schedule execution at a later time.

An interactive mode. The interactive mode will operate in a question-answer-suggestion fashion to help the searcher build a query. This mode will offer four levels of assistance, depending on the searcher's level of searching and subject expertise:

(1) Expert searcher, subject expert mode, where QBES gives assistance only when explicitly asked for.

(2) Searching expert who needs help on subject terms (thesauri) and on database selection. This mode will provide access to online thesauri, or lists of synonyms, and will link to the database portion of the DGIS Directory of Resources.

(3) Subject expert who needs help formulating the query. The query builder will offer context-specific assistance in constructing the query, such as using Boolean logic to broaden or narrow a search.

(4) Naive user inexperienced in database searching and with no in-depth subject knowledge. This mode is the largest in scope. It will draw on knowledge bases, and will operate in a question/answer interaction or maybe offer menu options.

Reference Expert System

DTIC is tasked with finding ways to automate DoD technical libraries. Reference librarians, as many of you probably know from experience, answer some questions again and again. Many of these repetitive questions could be answered by an expert system built by librarians. REx, or the Reference Expert System, is a proposed project within DTIC-E. It will be prototyped on a Macintosh, using Emerald Intelligence's Mahogany software, an expert system building tool.

Master User Address Contract File

Another microcomputer-based tool being tried out is VP-Expert, which runs on the IBM. One of my co-workers is prototyping an interface to DTIC's Master User Address Contact File. The MUAC contains information on all of our registered users. The Expert System would be used to query the file and retrieve results.

Hypermedia

We at DTIC have been interested in hypermedia for several years, gathering literature, looking at various products on the market, the platforms they run on, and identifying possible applications. Let me tell you about some of the things we've done, and what my current activity is.

We wanted to look at options in three different environments: the mainframe or mini-computer area, the workstation area, and the microcomputer area. We have prototyped applications in all three areas.

Mini-computer

Our mini-computer application was developed on the VAX 11/780, and was written in Prolog. Our first application was a small database containing an introduction to DTIC's Defense RDT&E On-Line System (DROLS) and its databases.

Contextual relationships between "chunks" of data are denoted by highlighting a term in reverse video on the screen display. Links between highlighted terms and their related files are made through a linktable written in PROLOG. The linking process is triggered when a user selects a highlighted term by placing the cursor anywhere in the highlighting and hitting the RETURN key. Prolog compares the character string of the highlighted term to the items in the linktable, and retrieves the text file whose identifier matches the string.

The mainframe or mini-computer orientation of this hypertext on the VAX is ideally suited to networks and gateway systems such as DGIS. Many hypertext applications are microcomputer- or workstation- oriented, which means that only one person can use the application at a time, and the user must be in the same location as the machine on which the application resides. By placing an application on a multi-user computer such as a mainframe or minicomputer, many people can access the application at the same time, and the user and host computer can be miles apart.

Workstation

For a while, we had access to a SU 3 workstation, so we prototyped a bit-mapped hypermedia application on the SUN. This was our CCL Desktop. We took the concept of CCI one step further by eliminating commands for database searching--the user could point and click at buttons on the screen to identify the database system to be searched, enter commands, perform Boolean logic, or select field or paragraph specifications.

The first version of CCL Desktop was written by a senior programmer from scratch in Prolog. Later, we put the ProWindows software package on the SUN and that same senior programmer was able to duplicate in a day and a half what had taken him three weeks to program from scratch. This was hard evidence of the usefulness of the many AI/Expert Systems software tools which are being developed and offered today.

Microcomputer

We have also used HyperCard on the Macintosh for hypermedia development. One of our contractor staff created a computer network diagram which identified all sites on the network, all the equipment at each site, the serial numbers, operating systems, or other characteristics for each piece of equipment. The plan was for this diagram to be an interface for, and connected to, a monitoring system, so it would identify malfunctioning equipment and possibly allow troubleshooting or corrections to take place from a central location. However, the network has been broken up, and a replacement HyperCard application hasn't yet been developed.

Several of us in DTIC-E recently started working with Supercard on the Macintosh. I've had a Mac II with a dual page color monitor on my desk for about a year. DTIC's Administrator also has a Mac, and he asked DTIC-E to develop some hypermedia applications on the Mac. We decided to prototype using Supercard because it has resizable windows, you can have more than one window open at a time, you can use color, and you can mix text styles, fonts, UID sizes within a single text field. Supercard has other capabilities which might make you choose it over Hypercard, but the ones I've mentioned are the only ones I know how to use so far.

We've tried to come up with several different applications which could be used either within DTIC or by our USMs. The first development was suggested by Ms. Ellen McCauley, DTIC-E's director. She had used an income tax preparation package called MacinTax, and she thought the concept could be applied to many of the forms required at DTIC. The first form we looked at was the Report Documentation Page, SF298. The 298 is the form which replaced the old 1473.

This application was designed to offer context-specific help in filling out the fields on the form. A co-worker and I have been working on this on and off for the past few weeks, and we've made a little progress. I thought you might be interested in seeing what we've got so far. It's a long way from finished, but I think you can get the idea of what we are trying to accomplish.

[Demonstration of the Supercard applications of SF298, the DTIC Library Tour, the Annual Users Conference Schedule, and DTIC's Handbook for Users followed.]

ROLE OF ASSOCIATIONS/NETWORKS/CONSORTIA
IN THE NEXT TEN YEARS (ROUNDTABLE)

BY

DR. STEVE BAUGHMAN, DR. DAVID R. BENDER,
KATHERINE BLAUER, JAMES H. BYRN, LOIS J. CAREY,
MARY B. LEVERING

SOLINET
A RESOURCE SHARING TRADITION

by

STEVEN A. BAUGHMAN

The arena of library networking and cooperation has become a complex one, with many organizations at various levels. Indeed, many library cooperatives share member libraries or provide service to many of the same libraries. While this situation may appear confusing to some, those of us who deal with the networking world on a daily basis gain an understanding of how it all fits together. The following brief overview is intended to give some background and perspective on SOLINET.

BACKGROUND

The Southeastern Library Network, or SOLINET, was founded in 1973 by a group of 99 charter member libraries who came together for the purposes of resource sharing and exploring the possibilities of automating cataloging. The organization this group founded has now grown to be the largest of the regional networks with 635 members. With headquarters in Atlanta, Georgia, it has forged leadership roles in the areas of resource sharing, database services, and preservation.

As with many of the regional networking groups, SOLINET, in its early history, explored the possibility of replicating the online cataloging system developed by the Ohio College Library Center -- a system which was emerging as technically viable, but which was not deemed likely to be available outside of Ohio. As the OCLC system stabilized and its power became understood, OCLC's officers made the decision to offer its capabilities nationally to groups of cooperating libraries that were willing to undertake their own support and training. There was no point in reinventing the wheel, so SOLINET's members opted to avail themselves of this opportunity for meeting one of their primary goals.

While to this day one of SOLINET's major functions is providing this training and support for OCLC's services, SOLINET has undertaken programs to augment and supplement the members' use of the OCLC service program as it has evolved. In the late 1970s and early 1980s, for example, SOLINET undertook a project to develop two capabilities which the OCLC system lacked: maintenance of local holdings online and subject access to bibliographic records. The capability that emerged was the LAMBDA online system which was operated out of the SOLINET

headquarter's data center in Atlanta. LAMBDA met all design goals and provided a southeastern database as well as interim local online catalogs for a number of member libraries in the southeast. As local integrated library systems became widely available, LAMBDA's remote capability became less attractive and the service was discontinued in 1987. Several spinoff services from the LAMBDA capability, however, are still among SOLINET's current program offerings.

SERVICES

SOLINET presently offers services in five broad areas. Most services are maintained for members but several are offered to the broader library community as well, either directly or through contractual arrangements with other network or consortium groups. SOLINET's service program may be summarized as follows:

1. OCLC services program support: New member profiling, training, and support are the mainstays of this program. This is no small undertaking; SOLINET added 45 new member libraries last year. Also included is the procurement and maintenance of the archive tape records of all of the members' cataloging transactions. An ongoing schedule of workshops and training opportunities is provided in the continuing education program which last year drew over 2500 participants.

While this program is primarily for the SOLINET membership, training services are provided by contract for FEDLINK libraries in the southeast. SOLINET also provides archive maintenance for several network groups, including INCOLSA and some PACNET libraries.

2. Database preparation services: The two major components of this service offering are 1) retrospective conversion and 2) tape processing.

SOLINET's retrospective conversion service provides full customized conversion. Utilizing the SOLINET database on CD-ROM or the OCLC online database, the staff matches records with the libraries shelflist (or a surrogate), keys local information and verifies completeness according to the library's editing specifications. The service recently celebrated the 5 millionth record converted. A database lease option is also available for in-house conversions.

The tape processing phase of database preparation consists of taking a library's set of MARC bibliographic records from whatever sources and readying them for use in the local

integrated system. While the processes required will vary depending upon the source of records, the library's cataloging practice, and the local system selected, typically the file will need consolidation, eliminating duplicates, moving holdings to the preferred version of the record, adding barcode information for custom barcode labels, and authority control. Preparation of records for setting holdings in the OCLC database is also provided.

3. Preservation services: The two major components of SOLINET's preservation program are: 1) Field Services and 2) Microfilming Services. Both are largely funded through an NEH grant.

Preservation field services maintains an ongoing program of continuing education and workshops to better arm libraries to deal with the brittle book problem and other associated issues relating to preservation, including disaster preparedness. Statewide programs are facilitated through this office. While disaster preparedness techniques are promoted, a helpline responds when disasters strike. These have ranged from a broken pipe in a ceiling to Hurricane Hugo.

Preservation microfilming is joint SOLINET-ASERL project which is funded by the NEH. Under this cooperative program, brittle materials from specialized collections in a number of the ASERL libraries are being processed and filmed. It is hoped that this program will become self sustaining and serve the broader southeastern library community after the initial project is completed.

4. Member Discount Program: Using the buying power clout of over 600 libraries, this program secures discounts on products and services the membership requires from the marketplace. Substantial discounts are made available to members on services ranging from online reference databases to CD-ROM products to various kinds of hardware.

5. Resource Sharing: While all of SOLINET is resource sharing driven, the activities in this area relate specifically to coordination of resource sharing initiatives both region-wide and within the individual states.

Resource Sharing & Networks Support (RS&NS) provides a forum for the leaders of emerging state and local networks to meet for informational programs and to share developments and successes within their own cooperatives. Cross-fertilization of ideas and a regional approach to their networking efforts result.

SoLINE, the SOLINET Information Network, is a region-wide Group Access database and interlibrary loan network for all libraries in the southeast which participate in any OCLC based resource sharing activity, including union lists and group access projects. SoLINE includes about 1,300 libraries and is the largest project of its kind.

FUTURE DIRECTIONS

SOLINET's future is already beginning to emerge. While its beginning was with the large academic libraries, as early as 1986 the network realized the need to make participation more attractive to the smaller library. A membership category was established and the response has been exceptional; over 135 small libraries are now active participants in SOLINET's program. This trend will continue and is being augmented by the large number of smaller libraries participating in the various southeastern Group Access projects and SoLINE.

The prospect of the electronic library is one with which SOLINET is involved and is already looking forward to a resource sharing approach for southeastern libraries' pursuit of these developments.

Enhancements to the regional database concept which SOLINET has fostered from the beginning and which is currently seen in the SoLINE bibliographic database are likely. Inclusion of southeastern state government generated information is a possible next step.

Continued expansion of membership, with a wider range of type and size of libraries is likely in SOLINET's future. The exciting resource sharing initiatives in the southeast have already begun to make regional level networking and OCLC participation a realistic option for a much broader cross section of the library community. As both SOLINET and OCLC service programs evolve, the base of membership will most certainly broaden. A corollary of this, however, is that continued proliferation of state and local networks and consortium groups will occur. This will further the extent to which SOLINET staff and members work within the tiers of networking, referred to at the outset, for maximum benefit to the libraries and their patrons.

SOLINET Manager, Member & Network Relations
October 1, 1990

ROLE OF NETWORKS, ASSOCIATIONS, AND CONSORTIA
IN THE LIBRARIES OF THE 90s

by

DR. DAVID R. BENDER

I am delighted to be here this morning to offer insights into the role of the Special Libraries Association in promoting and facilitating networking between members. While my fellow panelists are producers of information products and services designed to meet the networking needs of information professionals, SLA produces products and services to assist the information professional in every aspect of his or her career development.

Certainly one of the most important services SLA offers is the opportunity for members to network together, to find solutions to problems that are common, and sometimes uncommon, to the information profession. As you are well aware, special librarians are unique in their ability to find and utilize networks, both formal and informal, to assist in information gathering and dissemination. As you know, SLA's motto for many years has been "Putting Knowledge to Work." This activity, of course, would not be possible without the constant sharing of information between librarians, SLA is proud to be a facilitator in this process.

I would like to briefly give you some background on SLA, its mission and purpose, I would also like to tell you a little about the activities in which we are presently engaged. For those of you who are already members of SLA, please bare with me. For those of you who aren't members, I hope that my comments give you encouragement to join and be part of our wonderful network.

The Special Libraries Association (SLA) was founded in 1909 by John Cotton Dana, a librarian credited with developing the first special collection. The goal of the Association is to advance the leadership role of special librarians throughout the world. The Association's 12,500 members form an international network of information professionals whose common purpose is to meet the information needs of their clients.

SLA members work in special libraries serving such areas as business, research, government, universities, newspapers, museums and institutions that use or produce specialized information.

SLA is governed by a 14-member Board of Directors. A staff of 34 implement the policies adopted by the Board. SLA has 55 chapters located geographically throughout the United States and in Canada. SLA has one chapter in Europe. Chapters hold meetings throughout the year, offering member the opportunity to get involved locally and network with colleagues in the field.

SLA members are invited to join one or more of twenty-seven different subject area divisions. These divisions provide members with a means of direct communication with others who share a common subject interest or information format in their special libraries.

SLA also has three caucuses and a number of committees appointed by the president that provide direction for programs and services offered by the Association. SLA has thirty-eight student groups that operate independently of chapters. However, cooperative programs are undertaken and student members are encouraged to join in chapter activities.

SLA conducted a membership survey in 1986 in order to learn more about its members. The survey revealed that 55% of SLA members are between the ages of 31 and 45. Eighty-three percent of SLA members have a master's degree in library science while 70% have a bachelor's degree and 20% have an additional master's degree in a subject area. According to the survey, 48% of SLA's members are found in the corporate world. Eighteen percent work in academic institutions, 15% in nonprofit organizations and 13% in government.

The staff of SLA is committed to meeting the many and diverse needs of its members. Like its members, SLA is concerned with the dissemination of usable information to its clients. SLA's clients are its members as well as those audiences, including the general public, who can benefit from knowing about special libraries and the people who run them. To facilitate the process of information dissemination, SLA has hired for the first time in its history a "Chief Information Officer." The new staff member manages the publications, computer and information resource functions of the Association. She will ensure that information gathering and dissemination continue to be high priorities for the Association.

SLA's two-year-old Research Program is another vital information gatherer and disseminator. This past year, the Research Program has conducted the triennial (now biennial) SLA Salary Survey, prepared a profile of libraries and information centers in top U.S. and Canadian companies, and completed a technological assessment of the SLA membership.

SLA headquarters staff are also committed to bringing members the widest possible selection of educational opportunities. This year, SLA was presented with a "Certificate of Excellence" from the American Society of Association Executives for the first SLA Executive Development Academy. Conducted by the faculty and staff of Carnegie-Mellon University in March 1989, the Academy prepared information professionals for the challenges of the executive level.

Last year's State-of-the Art Institute, "Information: A Strategy for Economic Growth," drew information, business and government professionals from across the country and around the world. This year's theme is "Intelligent Systems: A Framework for the Future."

In the last year, SLA has introduced three new self-study courses designed for the busy professional. The authors of the courses are popular SLA regional instructors who have captured their lectures in an easy-to-use, self-paced format.

SLA Board of Directors and staff are extremely active in the information world, sharing their talents and expertise with a number of different information-related organizations. Because of its pivotal role in the information community, SLA has been a leader in examining information policies. Staff have also been active preparing for the 1991 White House Conference on Library and Information Services.

The Public Relations Program continues to follow its mission of promoting the Association and the profession. Extensive media coverage was received at the 1990 SLA Annual Conference in Pittsburgh. As the premier networking event of the year, the Conference provided a number of avenues for members to raise visibility for their diverse areas of concern and their overall contributions to the profession.

SLA will further expand its public relations efforts globally next year when it celebrates the first International Special Librarians Day on April 18. I encourage you all to use your networking skills to develop an awareness at home and abroad for the important role that military librarians play in the dissemination of information vital to all the world's citizens.

As SLA moves quickly into the 21st century, it follows two new road maps. One is a plan to increase membership in SLA by 2% for the next fifteen years. If successful, SLA membership will reach 17,500 by the year 2005.

The second road map is the SLA Strategic Plan developed by the Strategic Planning Committee under the chairship of Ann Talcott. The Plan, adopted last year by the Board of Directors, is also intended to span a fifteen-year period. The Plan takes a careful look at SLA's mission and the environment in which special librarians operate.

SLA's programs and services are future-oriented, taking into account the many changes in technology, the economy and rising expectations of information professionals. SLA's plans for the future include new strategies for gathering and disseminating information; more opportunities for professional networking; new continuing education programs to keep pace with member needs and changes in the profession; a greater role in educating future special librarians; increased visibility and awareness for the work of special librarians; more cooperation between SLA and other organizations that serve the information community; and increased worldwide activities.

I hope that I have disseminated some useful information. Thank you.

THE ROLE OF ASSOCIATIONS, NETWORKS AND CONSORTIA IN THE NEXT 10 YEARS

BY

KATHERINE BLAUER
Regional Marketing Manager, OCLC

As the millennium approaches we find ourselves looking ahead to what we hope to achieve at the same time as we are looking back over our shoulders at what we have accomplished. I am sure that most disciplines, and certainly those that are involved in providing access to information, are taking stock of the past and making predictions for the future. While it is relatively easy to make predictions, it is usually much more difficult to transfer vision into reality. Progress requires a great deal of commitment and cooperation, not to mention the resources to get the job done. In an age of ever-declining resources, commitment and cooperation become increasingly important items on the agenda since little will be accomplished without them.

Commitment and cooperation have been, and continue to be, hallmarks of the large multi-state networking systems in the US. Rowland Brown has referred to the 1970's as the "Golden age of library collaboration", when OCLC, RLG and WLN developed concurrently to serve the primary function of shared cataloging. Reducing the labor-intensity of that function, as well as controlling costs and, most important, sharing resources with others, were the underlying goals. Having gained control over current cataloging tasks, libraries quickly turned to retrospective cataloging to prepare for local automation. The 1980s saw a dramatic increase in the use of local systems in an effort to automate acquisitions, circulation, inventory control, and other aspects of collection management and development. The large networks continued to provide much-needed centralized resources for libraries; interfaces to local systems facilitated the transfer of MARC records. OCLC member libraries relied more and more on the ever-increasing capabilities and rich resources of the OCLC database for cataloging and interlibrary loan.

As we approach the last decade of the 20th century the picture is becoming much more complex and the options for libraries much more varied. Librarians and library users have come to expect technology that delivers on its promise--accurate, useful and timely information and all that without degrading response time. Local databases are being augmented by content-enriched

data that is specific to the needs of the community being served. In addition, those "local" databases often combine to create regional and state databases, as local initiatives are cemented by the vision and resources of a larger enterprise. Such an enterprise might be a large multi-campus academic institution, a federal library system such as NASA's, a regional resource-sharing consortium, a state library or even a multi-state network. Services offered run the gamut and they often overlap the services offered by the large networks. Interestingly enough, even where increased access to local resources has been maximized, interlibrary lending activity on the OCLC system has continued to rise at a steady rate. Statistics place intrastate ILL transactions at approximately 60% of the total, while 40% of the ILL transactions are interstate. Given that the OCLC Ill Subsystem saw a total of 4.2 million transaction in 1989/90, that's a very large number of interstate ILL transactions.

What, then, is OCLC's vision of the 1990's and how are we positioning ourselves to continue to be in the mainstream of library cooperation and networking? Several things immediately come to mind, including introduction of the PRISM Service, implementation of the new telecommunications network, a continued focus on building the OCLC database, and expansion of OCLC as a provider of reference and information services. How exactly do these initiatives continue to position OCLC as a main contender in library networking and cooperation for at least the foreseeable future?

First of all the PRISM Service, the long awaited new online system, whose last day of field test is today, will be introduced to a number of libraries before 1990 is out. The PRISM Service brings to libraries enhanced searching and editing features, menu and command interfaces, the ability to set system defaults to reduce keystrokes, improvements in Authority record processing and the MARC record export feature--in short, it brings features that libraries need and want desperately to improve their workflows and to interface more efficiently and effectively with local systems.

Delivery of these new functions will be across a new telecommunications network which is designed to take OCLC beyond the 1990's. The distributed x.25 network will have major node cities in Washington, New York, Los Angeles, Dallas, Chicago, Atlanta and Dublin, with an additional 38 minor nodes throughout the continental US. It has become increasingly clear that OCLC needs a new telecommunications network to not only support the increased functionality of the PRISM service and the EPIC service but also to facilitate links that go beyond the traditional terminal or workstation links that are currently in

place. I refer to non-OCLC local and wide-area networks, local systems terminals, and other national networks. OCLC also needs to implement a network that operates on standard protocols to facilitate potential linking. Telecommunications linking tests have been performed and OCLC expects to pursue linking much more aggressively once the new network is in place. Clearly, there are many implications of providing new methods of linking to OCLC and that path is fraught with regulatory, pricing, billing and technical support issues, to name but a few.

One of OCLC's strengths in national networking is the size, scope and quality of the database. OCLC is committed to continued growth of the database with the emphasis on both bibliographic records and holdings data. Improving matching algorithms to facilitate tapeloading of records from national libraries as well as from local systems continues to be a high priority. Expansion and continued development of record contribution and transfer through the Linked System Project is a major priority. OCLC's pricing strategies provide incentives for the online creation of original records and future pricing strategies will continue to reflect those incentives. OCLC will continue to emphasize database enrichment through procurement of records from a variety of sources. Access to authoritative information is a key focus. OCLC is investigating the feasibility of enhanced authorities services which include the availability of multiple authority files and an "automatic" authorities updating service for authority records already used by participating libraries.

OCLC's commitment to networking and to its membership has been underscored in the last year by the introduction of the EPIC service. OCLC members and non-members may use the common command language of the EPIC system to access a copy of the OCLC database as well as ERIC, ABI-Inform, Bookdata and, soon, Dissertation Abstracts. The EPIC service will also provide a gateway to EasyNet which will open up more than 450 databases with a single searching protocol to EPIC subscribers. Cooperation with organizations such as the American Association for the Advancement of Science in the electronic publishing arena is of strategic importance in the 1990's.

All of the initiatives I have described will result in a stronger and more viable OCLC--an OCLC that is also keenly aware of developments amongst our user communities through channels such as Users Council, Advisory Committees, Regional Networks and also through our many partnerships within the library community. OCLC users have a strong commitment to and reliance upon resource sharing; what they must have in return is an organization that continues to respond with services that support their needs for basic and enhanced services and at a

price they can afford to pay. That is the quid pro quo of networking.

I think that the biggest challenge ahead for networking in the 1990's is to stay focussed on future automation needs and future automation possibilities, at the same time not focussing too narrowly on the past for fear that we miss an opportunity. Hindsight may be 20/20 but it can also make one blind to opportunity and innovation. It will be too bad if, in looking over our shoulders, we end up with bloody noses because we failed to see what was ahead of us. Let's not forget that a quid pro quo means that we have to give something in order to get something back.

I think that brings us right back to the basic principles of commitment and cooperation, without which networking would not be possible. OCLC and networking--the two are inseparable. OCLC will continue to strengthen existing partnerships and seek out new networking opportunities. The 1990's, I am sure, will lead OCLC and you into a whole new era of library cooperation and networking.

THE ROLE OF NETWORKS
IN THE U.S. ARMY CORPS OF ENGINEERS
LIBRARY PROGRAMS

by

LOIS CAREY

I would like to introduce myself. I am Lois Carey substituting for Sarah Mikel, the Library Program Manager for the Army Corps of Engineers. In order to make this presentation meaningful I must first describe the USACE Library Program. There are 52 corps libraries, 50 located in the U.S., one in Japan and one in Germany. They range from small libraries of one person to libraries with staffs of 26 people. They are technical libraries established to support the Corps' engineering and construction mission. The libraries are automated using a variety of library automation services for cataloging, circulation, acquisitions, serials control and online reference services. The libraries are organized under Information Management and as such are in the forefront of all USACE automation and telecommunication activities.

Because of the libraries' varying sizes and far-flung locations we need networks. Our libraries are allowed to go beyond the limitations of size and geography and reach out to the world of information through networks. By linking the Corps libraries through telecommunications the Corps has broadened the range of the libraries' resources and services.

The Corps' libraries use several types of networks. The most popular trend in networking that has developed in the past year is networking through the use of LANs.

The Corps installs LANs at each of its activities. The Corps standard is ETHERNET. The libraries share in this resource by using the LANs to promote library services.

EXAMPLES:

NCD - Resource-Sharing through a Network - Division consists of 6 libraries (2 in Chicago, Detroit, St. Paul, Rock Island and Buffalo). The libraries share a similar mission support role and their collections reflect this. Their collections contain many of the same titles. They are in the process of identifying a core collection of reference sources and serials available on compact disc. They then will work with the ADP and telecommunication experts to establish a LAN to enable them to provide electronic access to the core

collection. The purpose is to utilize and develop this technology for the libraries as well as to decrease acquisition/procurement costs.

CRREL - Research Support through a Network - The Cold Regions Lab library supports scientists and engineers involved in cold regions research. The library's mission is to support the research of engineers and scientists. The library emphasizes technical journals and technical report literature. Its users are technologically sophisticated and expect the same from their library. The users can dial-in via the lab's ETHERNET LAN to access the internationally known Cold Regions Bibliography (also available for purchase by the public through National Information Services Corp.), Grolier's, Science Citations Index, World Weather, BIP, and Ulrich's. Through a special hook-up with the lab's VAX machine the library's card catalog is available for online searching.

ORD - Engineering Applications through Network Use - The Ohio River Division Library in Cincinnati has a file server connected to the Division's LAN and a Hitachi with 4 drives that provide access to construction criteria, specs and standards, Sweet's Catalog, the Computer Library and other tools essential to the day-to-day operation of an engineering activity.

Corps-wide Online Network:

The main network for the Corps libraries is our online computer system. It is presently on the LS/2000 System. It is connected by a telecommunications network that connects the entire Corps. The online network was installed to assist Corps libraries in locating the many Corps-issued publications, e.g., design memos, eis, and lab technical reports in addition to the extensive holdings of the libraries. The foundation of the system represents an enormous effort in bibliographic control that was begun in 1974 when the Corps began cataloging on OCLC. Prior to this time it was difficult for the reference librarians to locate materials without making numerous phone calls and inquiries. An online network facilitated resource-sharing and enabled the libraries to automate their functions of cataloging, public access catalog, circulation and statistics-keeping. The network has grown rapidly and the libraries are dependent on it. Future plans for replacing the system are underway:

Outline of Plans in Progress for Replacing the Present Online Network:

CBD Announcement - Potential Sources Sought
Task Force on Library Architecture
SAD Location
CEAP Telecommunications and Equipment

People Network:

In addition to the more formal networking in the Corps we have an unofficial network of librarians exchanging information and ideas daily. The librarians get together at Corps-sponsored meetings and training sessions. This operates in addition to a very active and articulate library grapevine. Unlike the large and more powerful elements within the agency the libraries are small and by maintaining good communications we often protect ourselves and resolve problems before they escalate. Of all the networks that we use this is probably the most beneficial. It is essential to the one-person libraries in remote locations that need the contact of other librarians to bounce ideas off and to discuss issues, problems and look for solutions.

In conclusion I wish to summarize the networks used to carry on the work of libraries:

1. Technology-based Networks, e.g., LANs, minicomputers, and telecommunications networks.
2. People-based Networks, e.g., information exchange, resource sharing, professional development.

Both types of Networks are essential to the successful functioning of the libraries and both enhance the value of the libraries to the mission of the organization.

FLICC AND ITS OPERATING NETWORK FEDLINK

by

MARY BERGHAUS LEVERING,
EXECUTIVE DIRECTOR, FLICC

Thank you for inviting me to address the annual workshop of the military librarians division of the Special Libraries Association. It is an honor to address such a wide range of librarians, from all levels and branches of the U.S. armed services and from Canada as well.

Dr. Samuel Johnson, whose dictionary became the resource around which our early libraries were built, once said that, "Knowledge is of two kinds: we know a subject ourselves or we know where we can find information upon it." As librarians, you have the best of both these worlds. Not only have you devoted your professional careers to acquiring quite a bit of knowledge but you also have the good sense to come together to communicate and share the information you have.

A meeting such as this is at the heart of networking. Woodrow Wilson put this way: "You get a good deal more light by keeping your ears open among the rank and file of your fellows than you do in private."

This especially true when fellow professionals share a common vision. As members of the Special Libraries Association, you are part of an organization that sees the necessity to sort out the future of networking right now in the present. SLA is one of at least 20 organizations that have endorsed the statement of a common vision in library networking. This statement has been issued by the Library of Congress Network Advisory Committee, chaired by Henriette Avram.

The statement recognizes that, while a common vision of networking and shared operational objectives is both possible and desirable, a monolithic nationwide network is impractical because of institutional diversity and a variety of economic and political factors. The statement promotes the concept of the "Nations's Library" as the aggregate of all available information resources and seeks to bind present and future efforts together in principle and philosophy.

In the search for a touchstone for the future of networking, this vision statement represents a starting point.

The statement reads--

"To realize this vision, there must be technical and intellectual sharing of resources between the public and private sectors; local, state, and federal governments must fulfill their responsibilities to individuals and society; and the diverse missions of the several types of libraries must be accommodated. As this vision becomes a reality, there will emerge a diverse but coordinated structure of networks rather than a monolithic one. Active research, rapidly developing technology, collaborative leadership, common standards, and shared communications will provide means by which the system will be further shaped as an interlocking series of local, state, regional, national, and international relationships that are capable of serving the nation's information needs."--

This vision of an interlocking series of networks guides us as we work today in the day to day tasks of shaping policies and managing operations. We are all working together, attempting to answer the age-old need so well stated by Charles Dickens when he had young David Copperfield cry out, "I ask only for information." What we are doing right now today, and in the field of library networking, will determine how that information needed by individuals and organizations is provided by networks in the future.

As the acting executive director of the Federal Library and Information Center Committee since March 1989, I have been privileged to work with FLICC and FEDLINK members on the revitalization of a program now in its 12th year of providing networking services to federal agencies.

Today, using FEDLINK service contracts negotiated by the Library of Congress, federal libraries and other agency offices can obtain information services directly from commercial sources.

FEDLINK began as a small nucleus of federal librarians cooperating to access OCLC services. By the end of the 1970s, access to a few on-line databases had been added. The program was still relatively small, but growing steadily. In 1981, there were a few hundred agencies spending about seven million service dollars on about a dozen services. By 1988, FEDLINK had grown to over 1400 federal agencies transferring over 100 million service dollars to use well over 100 commercial services. Though some of the contracts and services were discontinued in FY 1989 (including 11 that were not traditional library or information services) and with major restructuring in the last 18 months causing some bumps, in FY 1990 FEDLINK

represented over 75 million dollars in collective buying power for over 1400 federal agencies.

FEDLINK has undergone many changes during this period to insure that members will receive in the future services they need and expect. Additional managers with superb systems and financial management credentials have been hired. A new networked automated system has been developed and is being installed, providing FEDLINK's Fiscal Operation with a local area network tying over 20 workstations together, achieving far greater capacity and a more sophisticated approach. Key fiscal and contracting policies and procedures have been refined in close cooperation with the Library of Congress, General Services Administration, and other major agencies. The contracting process has been greatly revised and strengthened.

This has been an exhilarating and exhausting time as FEDLINK staff and members have shaped a more technically correct, more responsive organization.

FEDLINK's transformation is both a progressive stage in its own development as a network organization and also an illustration of what happens as networks advance from the early euphoria of being assembled as a mature state of fiscal and service responsibility. In the years to come, we intend that FEDLINK continue to provide cost effective access for all federal agencies to automated database services and bibliographic utilities, to publications services--including a wide range of serials, books, and microforms, and document delivery--and eventually to more library automation services.

What is our vision of the future for FEDLINK and networks in the 1990s? Technologies continue to develop that allow us all to communicate and share more, and to do so more rapidly. There is more interconnectivity developing between networks. The Internet is actually a conglomeration of many smaller networks and a highway for their interconnection. NREN, the National Research and Education Network initiative, will enhance that development and propel it forward.

Currently, FEDLINK and the FLICC working groups, such as its Education Working Group, are providing opportunities for federal librarians to stay informed about developments in supercomputer networking and NREN. FLICC has distributed Special Reports on NREN and the Coalition for Networked Information. On October 23, we held a FLICC Seminar on Supercomputer Networks and Libraries. Networking will be a key topic at the 1991 FLICC Forum in March 1991 and the Federal

Pre-White House Conference November 26-27, 1990, at the National Library of Medicine. Some of you will serve as delegates or alternates to that conference.

Many federal librarians are likely to find that they have a role to play within their agencies as information services become more closely integrated via a nationally organized and funded research and education network. The federal community can take advantage of the FLICC forum for discussion and education in its effort to play a strong role supporting the government's consumption and distribution of information. Many, many issues remain to be resolved before national networking can reach its full potential. Some of these issues--such as copyright, the relationship between the commercial and government sectors, and providing funding or assessing appropriate fees--require careful consideration. Perhaps our experience in the FEDLINK network, in providing a relationship between federal agencies and the commercial sector, will help us appreciate the difficulties and the advantages of a strong relationship there. We hope, at any rate, to continue to provide a nucleus for education and discussion.

We also expect to see progress on the working level as well, working with vendors to process invoices more automatically. We have developed our new automated fiscal system in such a way that we can begin in the future receiving automated invoice data, at first probably on tape or diskette. That will speed up our fiscal work tremendously, and make it more efficient to serve you better. It will help insure that our costs and the vendors' should be kept under control that way.

We will undoubtedly see the government moving further in this direction. The Department of Defense has been instructed that for some large procurements they are to use x.12, a standard for Electronic Data Interchange being used in business for the transfer of order and invoice data and payment.

There has been some discussion and even controversy in the library and publishing community over the adoption of x.12. BISAC and SISAC--the Book Industry, and the Serials Industry Standards Advisory Committees--have already developed standards for transferring orders electronically, and those standards are in use in many places. After consideration, members of the publication industry have decided to adopt the larger, industry-wide standard, x.12. It has also been necessary to examine the compatibility between MARC and x.12. An argument in favor of adopting x.12 is that many publishers want to use it because their other training partners do. Libraries are not a significant enough part of

Libraries will see more benefits from the groundwork that has been laid by earlier investment in automation as more interconnectivity between systems develops. Associations will continue to play an important role in developing the standards that make it possible to connect different systems, and will continue their role in education and consciousness raising. Standards are adopted on a wider and more timely basis when we work to help everyone involved understand the advantages. SISAC has been working for the last few years to expand use of the ISSN to include publishers adding bar codes with ISSN and issue information that could be read automatically into checkin systems. Another initiative, one that relates to NREN, is developing standards for an Electronic Library Communications Format that would expand beyond MARC and bibliographic information support electronic communication of full text, visual, and other materials.

Within individual agencies, the agency network will be more likely to interconnect with the library's system and with commercial information services, and eventually to connect through national networks such as Internet or NREN. The library at the National Institute of Health Division of Computer Research and Technology has for some time had its micro-based on-line catalog connected to the campus network, so that agency staff with PC-based machines can search the OPAC on the LAN. Anyone with Macs or some other operating system must dial in--an example of the disadvantages of working in an area where standards have not yet prevailed. Ellen Chu, the librarian at DCRT, says that federal labs and agency headquarters are most active in the area. They also use the campus LAN to connect to E-Mail on BITnet and the Internet. DCRT's OPAC is The Assistant, one of the more inexpensive micro-based library automation packages. The LAN is an ethernet LAN; its brand name is 3-com.

There are more opportunities for work to be done on smaller or more specialized networks, and for them to be connected to larger networks. Also, work previously done locally can be loaded into larger networks to reap the benefits of resource sharing in a larger community. Jim Byrn's staff at TRALINET have talked to OCLC about tapeloading a serials union list developed in-house onto OCLC, and have concluded that, in this instance, it will be as easy to find the records and build the brief union list fields manually. They will have the advantage in the future of data in a standard format.

The Veterans Administration libraries, on the other hand, have opted for tapeloading union catalog data. They have recently established with OCLC a way to continue to do centralized cataloging under one OCLC symbol, VET, and then

automatically set holdings for each VA library. They can continue to load tapes onto the VA network for interlibrary loan among VA libraries. They have also prepared the way for more interlibrary loan on the OCLC system with other libraries.

More libraries that otherwise might not be able to participate in the national resource sharing community will tapeload holdings from other systems onto OCLC. FEDLINK has established a sounder contractual basis for this in the entirely new and detailed LC/FEDLINK contractual agreement negotiated with OCLC during FY 1990. Together OCLC and FEDLINK staff will be working to get the word out to libraries about their range of choices. We have federal libraries with very specialized research collections, such as the National Archives and the National Gallery, which for various reasons have chosen to do their cataloguing on RLIN. They can still tapeload onto OCLC and interact with the OCLC ILL system cost-effectively, thereby continuing full participation in the federal and national community of libraries.

There is a movement toward laying the groundwork for interconnectivity by adopting the telecommunications systems that support it. OCLC has changed the backbone of their telecommunications network to the standard x.25. The federal government has its implementation of FTS2000 well under way, and you will be hearing more about it today. OCLC's change in its telecom network would enable us eventually to link to FTS2000 for access to OCLC. If such a connection comes to pass, it would affect your budgets by changing how telecommunications is billed and, perhaps, by lowering costs--although that key part of the analysis remains to be done before the government's choice can be made. It is possible more of the charges might be billed with your agency's other telecommunications bills; and, therefore, at some agencies less of the cost might have to come directly out of the library's budget. More of your "service dollars" may remain to spend on OCLC and other services.

As interconnectivity continues to make these ripples, there is a second network development occurring. Participants in a network such as FEDLINK become more interdependent and make more of an investment in the network--and you deserve a good return on that investment. The investment starts when time is taken to learn to log on to a system. Then it is necessary to keep current on changes in function and documentation. Your staff time is used for training. And the costs of using systems must come out of always meager funds. Often extra time must be allocated for committee work to insure the network operates efficiently. The challenge to existing networks is to continue to provide a good return on this investment of members' time and

money by increasing the benefits to you. FEDLINK is trying to do this by taking advantage of changing developments, improved technologies, new systems, and new services.

As connections develop and more of an investment is made, trying circumstances require more effective modes of operation. At FEDLINK staff meetings this past year, network librarians have been brimming with ideas about what could be done through the network, but have been frustrated because organizational emergencies have put a premium on the time they could devote to development. FEDLINK hears daily that you experience a similar frustration. Federal agencies are short staffed and you are working very hard to continue to provide good service with limited resources. This makes networking even more important to you. Especially when there is less time and funding to consider even more choices. It becomes imperative to network in smaller groups, making joint decisions.

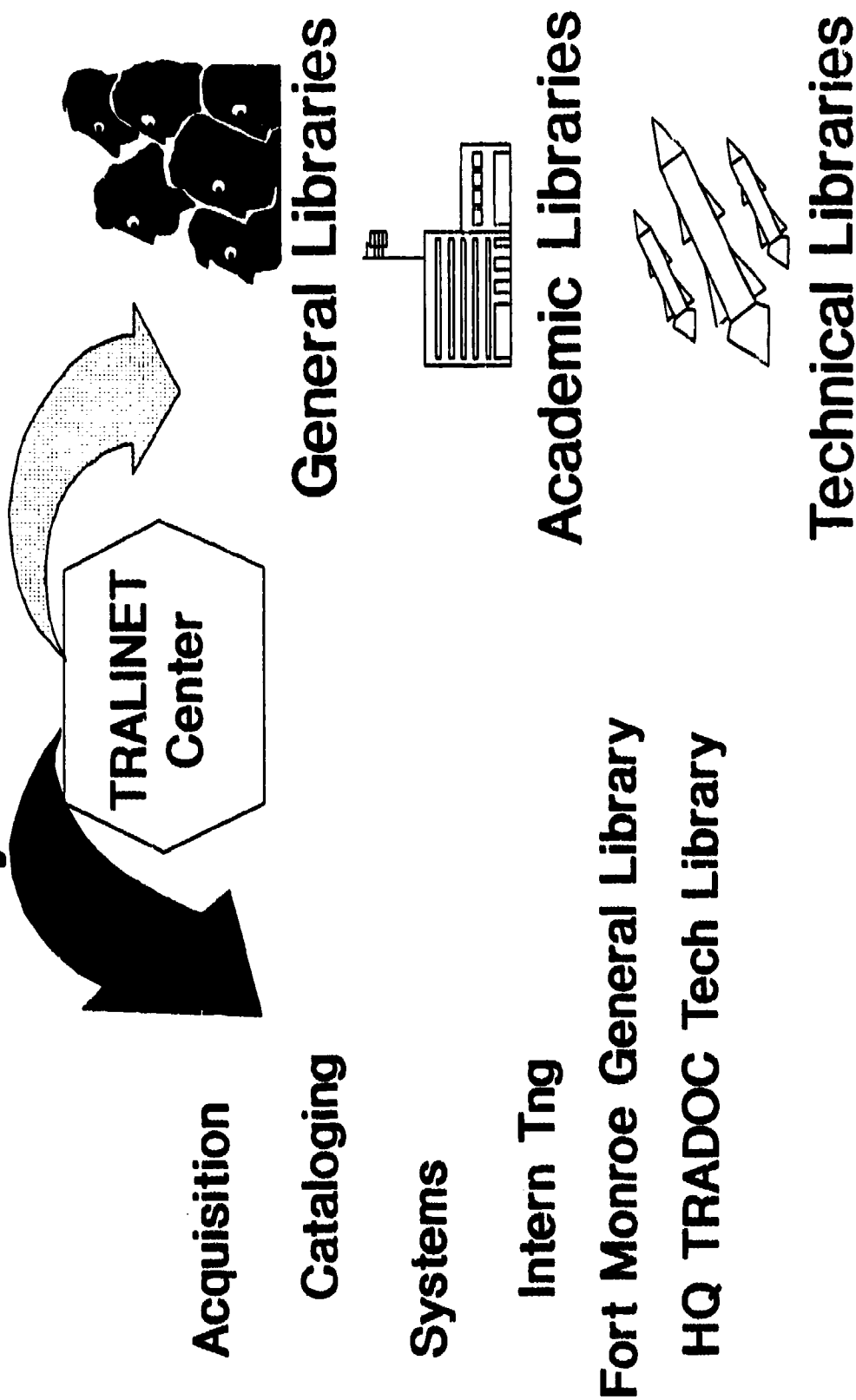
As FLICC/FEDLINK and the federal library and information center community proceed into the 1990s, what is clearly crucial in networking is that we are establishing complex connections . . . we are making considerable investments. . . and we are finding new ways to work things out together. At FEDLINK, we have taken these developments into consideration as we take steps--often difficult, sometimes painful, always necessary--to provide members with the service you need and expect in the 1990s. We look forward to meeting the networking challenges of the 1990s with you.

TRALINET
Tradoc Library and Information Network

Presentation by
James H. Byrn

TRALINET

TRADOC Library and Information Network



essence

TRALINET Center Mission

Unify all TRADOC library systems into one command-wide, full-service information network. Serve as a focal point for fielding of new library and information science technology in TRADOC libraries, to include necessary systems analysis, hardware, software, telecommunications and training. Broker access to key governmental and commercial bibliographic and full-text databases for research. Provide centralized acquisition and cataloging of library materials. Manage HQ TRADOC Technical Library and Fort Monroe General Library. Manage TRADOC Librarian Intern Training Center and Librarian Career Program.

Major Goals

1. Improve capability of libraries to provide research support to the TRADOC mission areas.
2. Assist in recruitment and retention by embellishing current capabilities of our general libraries to serve the soldier and his family.
3. Fully automate TRADOC libraries to increase efficiency.
4. Improve overall quality of TRADOC library personnel through training and recruitment of qualified librarians.
5. Reverse downward spiral in resource support to TRADOC libraries in order to accomplish above goals.

Strategies

1. Encourage sharing of resources between TRADOC libraries.
2. Eliminate duplicative practices in and between TRADOC libraries.
3. Establish and/or enforce technical standards, especially in the area of automation.
4. Improve and/or establish procedures for capturing copies of TRADOC-generated studies for future researchers.
5. Improve library materials acquisition by exploring and providing more efficient methodologies for procurement.
6. Centralize library cataloging to the maximum extent feasible.
7. Create and capture a machine readable catalog record for all books in TRADOC.

Strategies

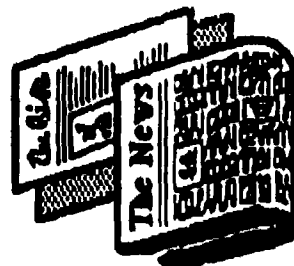
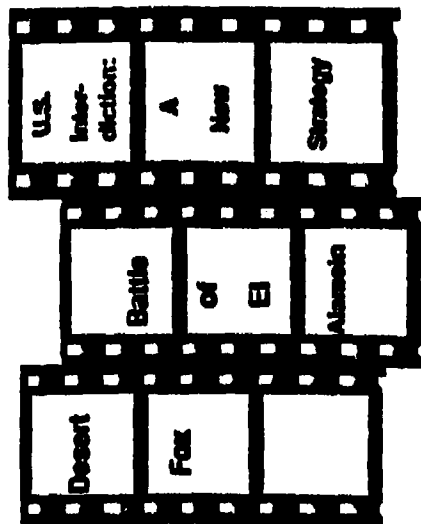
8. Train library personnel to use new automated equipment and databases.
9. Centrally evaluate, acquire, and to the maximum feasible extent, fund needed technology.
10. Identify and broker access to key governmental and commercial databases for research.
11. Through Librarian Intern Program, improve quality of training of new TRADOC librarians.
12. Actively manage TRADOC Librarian Career Program to ensure maximum and equal access of our librarians to training and promotion opportunities. Provide positive input into selection of key managers at local level.
13. Actively monitor overall resourcing of TRADOC libraries and lobby all pertinent funding sources.

I RADOC

LIBRARY

COLLECTIONS...

BOOKS AND FAR MORE



TRADOC LIBRARY COLLECTIONS (TLC)

- Identifies materials common to types of libraries, establishing a "core"
- Captures quality materials incorporating the future needs of TRADOC
- Maintains relevancy thru updating collections routinely
- Establishes solid funding baseline

Dictionaries,
encyclopedias,
almanacs



TQM, i.e.

Deming Library

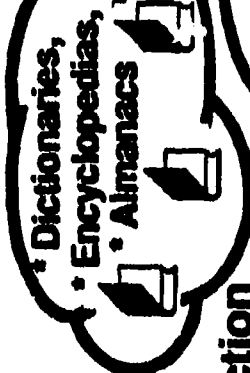


Countermarcotics
Transitioning
Distributive Training
Low Intensity Conflict

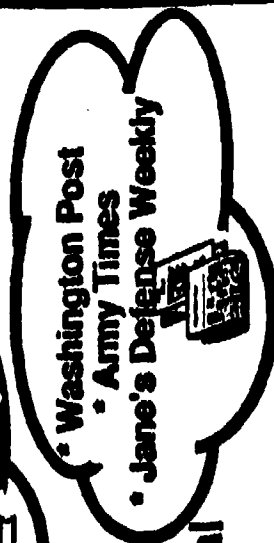


TLC CURRENTLY CONSISTS OF

Core reference collection



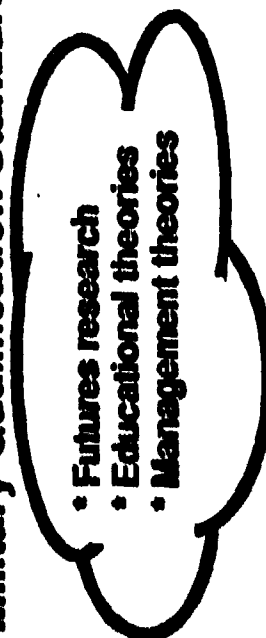
Core periodical/newspaper collection



Core audiovisual collection

Projects a TRADOC enhanced professional reading collection:

- * Contemporary Military Reading List
- * Military Qualification Standards II

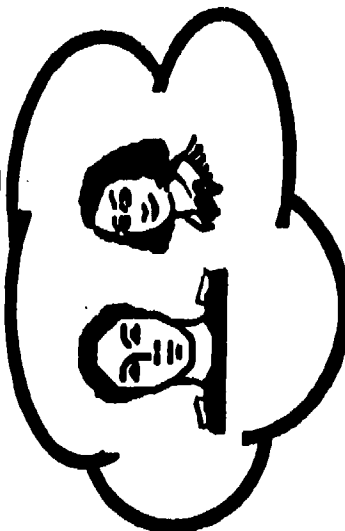
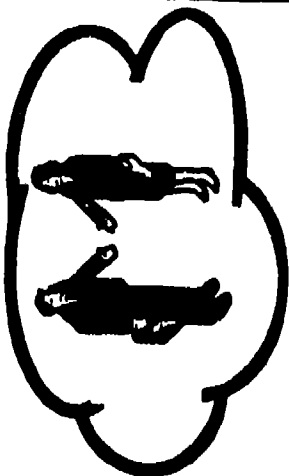


METHODOLOGY IN DEVELOPING TLC

✚ Uses standard professional library tools

✚ Incorporates military expertise of

- * TRADOC Installations
- * HQ Specific Experts



ARMY

★ ★ ★

Other MACOMs
CFSC
AMSC
HQDA
West Point
AWC

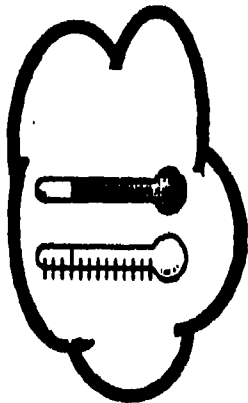
DOD

★ ★ ★

Pentagon
Naval War College
Air Force Academy
National Defense Univ
AFSC

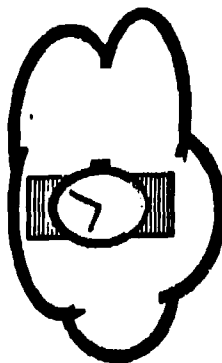
TLC IS A

Measurement Tool



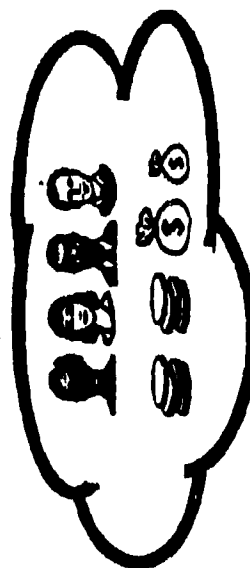
- * Assess quality of current collections
- * Assist collection development efforts

Strategic Tool



- * Build-in and plan for excellence
- * Better posture libraries in future environment
- * Build upon current infrastructure

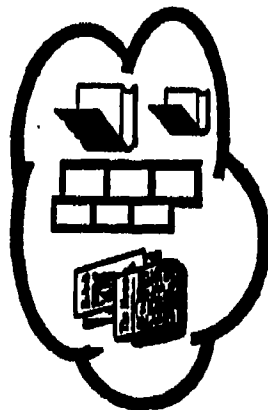
Budget Tool



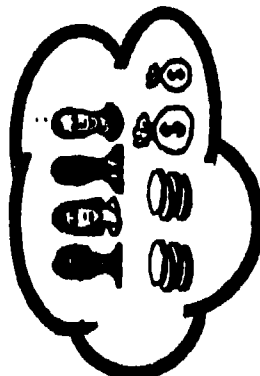
- * Quantify library resource requirements

TLC GOALS

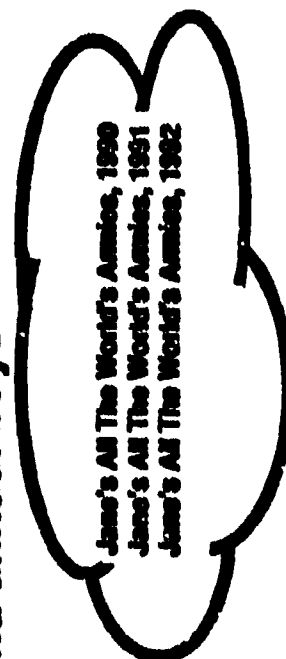
- 1. Sponsor command level buys of core materials to be placed in each library



- 2. Efficiently and cost effectively meet TRADOC's library resource needs



- 3. Maintain collection relevance thru routine updates and annual buys



UPDATES

BY

TONY DAKAN, STANLEY KALKUS

AIR FORCE LIBRARY AND INFORMATION SYSTEM

ANNUAL REPORT, FY 1990

by

TONY DAKAN

Along with the rest of the world, Air Force librarians are currently much taken up with Operation Desert Shield. Our involvement is direct and personally satisfying. From the beginning, huge quantities of paperback books, audio and video cassettes, magazines, and newspapers are making their way to personnel deployed to the Persian Gulf area, as well as those en route. The USAFE Library Service Center at Ramstein AB took the lead, and is now being assisted by donations of paperbacks from bases around the world and special kits of carefully selected titles purchased by the Air Force Library and Information System. The Tactical Air Command library system, Langley AFB, Virginia, funded the purchase of 2,500 copies of the European edition of USA Today. USAFE made arrangements for them to be trucked to Germany and put on cargo flights on a daily basis. The Office of the Director of the Air Force Library and Information System received and accepted offers of free subscriptions to over 25 popular magazines from publishers. These donations are also now on their way to the Gulf on a regular basis. Realizing that men and women in that bleak desert environment need more than books to occupy their leisure time, the USAFE Library Service Center is now shipping audio and video cassettes, including Arabic language tapes with accompanying study texts. Will libraries be established there in the future? Very probably. If the decision is made to do so, we'll be able to draw on the experience of the USAFE Library Service Center, which recently set up its fourth instant mini-library at Geddi AB, Italy. Meanwhile, through the combined efforts of all Air Force librarians, our men and women will be assured of library service. The closure of Air Force bases brings new challenges also. Already closed or announced for future closing are: RAF Fairford, RAF Wethersfield, and RAF Greenham Common in the United Kingdom; Pease AFB, New Hampshire; Chanute AFB, Illinois; and Mather, George, and Norton AFBs in California. Other announced closings include Hellenikon AB, Greece; Lindsey, Hessisch-Oldendorf, Wiesbaden, and Zweibrücken ABs, Germany; Suwon, Kwang Ju, and Taegu ABs, Korea; Torrejon and Zaragoza ABs, Spain; Comiso AB, Sicily; and Eskishir/Ermaç, Turkey. No doubt more closings will be announced. While some libraries disappear, others get a new look, and once in a great while, new buildings. The Strategic Air Command bases at Minot, Loring, and F.E. Warren AFBs, are

now blessed with brand-new libraries. The library at F.E. Warren is a source of special pride. It was designed and furnished to blend perfectly with the Victorian aspect of that historic base. After years of waiting and planning, the beautiful new Air Force Institute of Technology Library at Wright-Patterson AFB, Ohio, is a reality. It combines all library services for the Institute, and is the centerpiece of the new campus.

The Weapons Laboratory Library, Kirtland AFB, New Mexico, wins the prize for being the first DoD library to install the STILAS integrated automated system. Based on reports to date, the system is not only state-of-the-art, but within reach of any DoD library. Without a doubt though, the greatest success story this year was at Eglin AFB, Florida. Phyllis Morgan and her dedicated staff were faced with almost a year of closure and reduction of services while the library was renovated and expanded. That was an unacceptable situation, so they beat the bushes and garnered support not only of their command, but of the civilian communities surrounding the base as well. They arranged for Eglin base personnel to have free access to public and college libraries in the area; encouraged use of the Hurlburt Field library, just miles down the road; and offered limited services at various locations on the base, including the Technical Library. During this period they also installed a CBI system, and were online for the grand re-opening! Little wonder that Phyllis was awarded the Air Force MWR Meritorious Librarian Award in 1969. That was also the year Eglin AFB won the coveted Curtis E. Le May Award for outstanding overall Morale, Welfare and Recreation programs and services. Changes in command structure within Air Force eliminated the 30 year old Alaskan Air Command, and transferred responsibility for library service at Elmendorf, Eielson and Shemya AFBs, and King Salmon and Galena AFSS, as well as the Strategic Air Command's Andersen AB on Guam, to the Pacific Air Forces Command. The Air Force Space Command picked up Patrick AFB, Florida, and Vandenberg AFB, California as part of the current Air Force reorganization. The 12th Annual Air Force Librarians Workshop held in the Congress Hotel, Chicago, in conjunction with ALA, attracted nearly 100 Air Force, Army, Navy, and Marine Librarians from around the world. "A Stronger Staff: The Path to Mission Excellence" was the theme of the workshop, and continued the objective of providing "back-to-basics" training for library managers. It featured mini-workshops on "Surviving Change Without Burnout", "Selling Yourself to your Supervisor or Commander", "Position Classification for Non-Classifiers", "Preparing and Presenting Effective Briefings", and "Software Instruction". An impressive number of Air Force librarians were honored in Chicago for their accomplishments. Susan Whitson, Base Librarian, Hurlburt Field, Florida, received the annual Air

Force MWR Meritorious General Librarian Award; and Carolyn Ray, Director, Wright Research Development Center Library, Wright-Patterson AFB, Ohio, was presented with the Air Force MWR Meritorious Technical Librarian Award.

Margaret Ono, Base Librarian, MoChord AFB, Washington, was the recipient of the Newsbank Scholarship Award. Phyllis Bell, former Base Librarian, Misawa AB, Japan, and now on the staff of the Air University Library, Maxwell AFB, Alabama, was honored at the H. W. Wilson tea, where she was presented a John Cotton Dana Library Public Relations Contest Award for her unique children's summer reading program and series of television spots promoting her library's services.

Annette Gohlke, Assistant Director, Air Force Library and Information System, received the Armed Forces Library Section's Certificate of Merit. Ms Gohlke had previously been selected as a finalist in both the Alamo Federal Executive Board's annual awards program, and the Randolph AFB Federal Women's Program Most Outstanding Women of 1989. Notification has just been received that she has also been selected to represent the Air Force as its nominee in the upcoming General Services Administration 1990 Excellence in Administration Awards Program.

Library support of Total Quality Management continues, with librarians preparing reading lists and bibliographies; special displays, speakers, and programs; and lots and lots of publicity. In addition, they've now committed themselves and their libraries to active support of the Transition Assistance Program, designed to prepare departing military for a return to civilian life--and we hope the civilian work force. The program is under the direction of Education Services Officers at each base, with libraries, Family Support Centers, and Civilian and Military Personnel Offices designated points of contact and referral.

As we go into the new fiscal year, there's evidence that it's going to be a year of dramatic change. I have confidence that Air Force librarians will meet the challenges head-on, and come out on top. I'll report the score next year.

NAVY UPDATE

by

STANLEY KALKUS

Since I assumed the duties of the Director of Navy Department Library thirteen years ago, I made an effort to establish the Coordinator's function as a separate function. Well finally we succeeded. Approximately two years ago the office of the Librarian of the Navy was established and I was the acting incumbent in addition to my position as Director of the Navy Department Library. On May 20th of this year I was appointed Librarian of the Navy and a few days later also acting Director of the Navy Department Library.

The position of Director was advertised and at the end of August of this year, filled. The new Library Director is my former assistant, Mr. John Vajda.

The secretary of the Navy Instruction 5070.2B on Management of Naval Libraries still has not been published. It was returned to us this summer from VCNO with a suggestion to combine the SECNAV instruction on Navy General Library Program with proposed instruction. All this happened after we spent a lot of time on rewriting the instruction so it would be acceptable to CNET. CNET, particularly Marge Homeyard, were extremely cooperative and helpful in producing the draft. With an input from Marge Homeyard we went back to VCNO requesting that the instruction be published prior to our efforts to combine the two instructions. We were promised that they would reconsider and since we have not heard anything from O9B we expect that it will be published.

Speaking of CNET I have some news from Marge Homeyard on the General Library Program: "(1) Marge Homeyard was selected to fill program's lead position; (2) During the year program supported over 1,000 elements: 1478 Navy and 28 Marine Corps shore libraries, 510 ship, and 334 small remote units. Material support expenditures were close to \$2.8M; (3) Revision of program manual is underway; (4) Operation Desert Shield support is ongoing and includes refreshing paperback reading collections for deploying ships, stocking libraries on board 2 hospital ships, and shipping paperbacks into Bahrain for redistribution. Our efforts have received excellent support/coordination with Army and Air Force library programs; (5) Operation Desert Shield has been a springboard for an AP wire service story and local newspaper and TV coverage for naval general libraries and central program functions; (6) The future direction of general

library program was the focus of an 8-day NMPC MWR policy board study group in September. We anticipate recommendations which will promote adequate resources and efficiencies for all program elements."

I hope that there will be improvements in funding the general library programs and I am happy to see that Marge Homeyard was selected to be in charge. I had an opportunity to experience how the program works aboard the ships. In May I spent a week aboard the USS STUMP on a familiarization cruise and was surprised what a neat library they had aboard that destroyer.

Our ongoing projects include the Union List of Serials. We are still experiencing some problems with access and updates. I hope that these problems will be solved now that I can give it my undivided attention. There are of course other things to do: keep the List of Naval Libraries up to date, this depends to a large extent on cooperation of all and improved communication with Naval libraries. The Director of Naval History wants me to visit as many naval libraries as possible and approval of my travel budget would make it possible to visit libraries outside of the Washington Metropolitan area. For the purpose of better communication we have installed a fax machine in the office of the Librarian of the Navy. The number is (202) 433-9553 or Autovon 228-9553. Quarterly meetings of area Naval librarians are and will continue to be held, with one meeting convening as part of the CONSATL workshop. CONSATL is of great help to the efforts of the former Coordinator of Naval Libraries, now Librarian of the Navy and I will do all I can to support this organization. The last workshop sponsored by Navy Oceanography Center was a great success. But I must be fair, all the workshops I have attended were successful and very useful. But in Bay Saint Louis we saw a brand new Navy Library equipped with new, modern furniture, plenty of space and other conveniences usually not found in our libraries. (Obviously there is hope.)

Speaking of hope, the Secretary Committee on History, which also covers the libraries is being reestablished. Not all members have been appointed by the Secretary and there is some last minute input. But we know that at least one librarian, Dr. David Bender, executive director of SLA will serve the next two years on that committee. The committee will hold its first meeting in January 1991.

In my not so new function, I am trying to keep abreast of all new developments, not only in the Federal Libraries, but in libraries in general. I serve on the FLICC Policy Working Group, I intend to attend as many events held by FLICC and

FEDLINK as possible and also be involved with the newly established AFLS roundtable within ALA.

Marge did not include in her notes the one day workshop she organized for the general library program librarians in connection with the ALA conference in Chicago. It was the better part of conference programs I have attended.

We have no placement programs for librarians, however we would like to provide service to people looking for jobs and libraries seeking to fill their vacancies. This will be a subject of our next quarterly meeting however I would like to hear from the Navy and Marine Corps librarians anytime. If you have any suggestions please speak up. Also if you wish, you can send us your vacancy listings; many of you are already sending them. Another area we are interested in thanks to the efforts of Mike Dankewych is the machine translations. He organized a committee which is examining the feasibility of establishing machine translation capabilities for the benefit of all Navy libraries. I hope to be able to report in greater detail on this brand new project next year

MILITARY LIBRARIANS WORKSHOP (MLW) EXECUTIVE
BOARD MEETING MINUTES

BY

GRETCHEN CHEUNG

SPECIAL LIBRARIES ASSOCIATION (SLA)
MILITARY LIBRARIANS DIVISION (MLD)
MILITARY LIBRARIANS WORKSHOP (MLW)

EXECUTIVE BOARD MEETING
MINUTES

WILLIAMSBURG, VIRGINIA
9 OCTOBER 1990

CALL TO ORDER

The meeting was called to order by the Chair, Normand Varieur, at 1600 hours, in the Wyndham Williamsburg Hotel, Virginia.

Voting members present were: Normand Varieur, Norman (Tony) Dakan, Kathleen Wright, Laurie Stackpole, and Gretchen Cheung. Nonvoting members present were: Marcia Hanna and Paul Klinefelter.

Also present were: Gary Walter, Kathryn Marshall, James Byrn, Janet Scheitle, and Marie Harper.

Members of the Board unable to attend were: Barbara Fox, Barbara Everidge, and Katherine Sozanski.

Gretchen Cheung accepted the appointment of Acting Secretary to record the minutes of the meeting.

APPROVAL OF MINUTES

Minutes of the 7 February 1990 meeting, having been sent previously to each Board member, were approved as written.

ANNOUNCEMENTS

The Chair presented the new MLD Chair, Laurie Stackpole, and the Chair-Elect, Marcia Hanna. The new MLD/MLW Treasurer, Katherine Sozanski, was not present. The new Immediate Past Chair, Barbara Fox, has taken a new position at White Sands Missile Range and also was unable to attend the meeting.

MLW-34 PROGRAM

James Byrn presented a report on the program of the present workshop. Each speaker was given a comprehensive outline of their part of the program to ensure there was no overlap in the material presented.

He suggested that the Board consider changing the time-frame of the workshop to facilitate attendance. The present date often coincides with severe budget restrictions at the end of the fiscal year. A date in late August, September, or early November would avoid this conflict. The Board agreed that the date of the Workshop is negotiable since it is not stipulated by the Procedures Manual and could be changed in consultation with each year's Planning Committee. The MLD Long-Range Planning Committee will also discuss this issue.

Janet Scheitle presented the interim financial report on the workshop. Despite budget difficulties, attendance is good; but there may be a deficit of about \$500. For the first time, the presentations will be videotaped. The method of distribution of these tapes remains to be determined.

The Board gave a hearty round of applause to James Byrn and Janet Scheitle for the excellence of their work in organizing MLW-34.

CEU CREDITS

SLA will receive a list of the names of participants, and will send CEU certificates to Janet Scheitle. TRADOC will send them on to the participants. SLA is very impressed with the Workshop program, and the Board expressed its appreciation of the work to Murray Bradley in the role of liaison with SLA in this matter.

MLW-35

Gary Walter from the Defense Language Institute (DLI), host of the next MLW, requested that an official letter be sent to the host. This, most probably has already been done, since a letter of agreement between the parties is usually exchanged well in advance of the date of the Workshop. The Chair will check the files for correspondence with DLI.

Program planning is underway: Carolyn Alexander has been named Program Chair. Accommodations are still being arranged.

The procedures for obtaining CEUs from SLA are mentioned in the Procedures Manual. Host must send list of speakers, with bios, to the Chair, who will forward it, with other pertinent information, to SLA. The chair will give Gary Walter a timetable for these procedures.

FUTURE WORKSHOPS

The sites of future workshops were reviewed, and the change for MLW-38 in 1994 from US Army ARDEC at Parsipanny, NJ to US Army RSIC at Huntsville, Alabama was noted.

Marie Harper, Bulletin Editor for the SLA/Rio Grande Chapter, gave a brief update on arrangement for MLW-37 in 1993, to be co-sponsored by the Chapter and the Air Force Weapons Lab (Albuquerque, New Mexico). Date may be an issue for this group; because of possible conflict with local events (International Air Balloon Festival).

There was no spokesperson present for MLW-36 in 1992 (Naval Underwater Systems Center, New London, Connecticut).

Possible naval sites in the northwest for MLW-40 in 1996 were discussed, as well as the possibility of a site further south in collaboration with the San Francisco Bay Area Chapters of SLA. Kathy Wright undertook to contact possible sponsors.

The possibility of a Canadian site was discussed, but members were extremely concerned about local permission being granted for travel outside the United States. Gretchen Cheung will continue to explore this possibility.

MLW INVITATION LISTS

The Chair clarified some points regarding invitation lists for each Service in response to a query from an MLD member. The invitation system has evolved through experience, and has stood the test of time. It ensures an equitable distribution of representation from all the Services. Late nominees or alternates can be added if there is space. The proportional representation of the Services is maintained in naming alternates. Chair will provide a written response to the member's concerns with a copy to Board members.

Several members suggested that the workshop organization be explained yet again in the MILITARY LIBRARIAN, and that an effort be made to publicize it in SPECIALIST, and at the chapter level. Paul Klinefelter and the Chair agreed to work on this

after plans for the next workshop are presented at the mid-winter meeting. It was also suggested that MLD needs a Public Relations Committee to promote its activities.

SLA/MLD members who request an invitation through the MLD Chair must quote a valid SLA membership number at the time the request is made. Nonmilitary requests for invitations are filled from these invitations. The limit of 50 invitations on this list could be changed at the discretion of the Host of each workshop, by acceptance of nominees to replace a certain number of the Host's invitees/participants.

Service representatives were reminded of the importance of seeking participation from smaller units, especially intelligence and medical units.

Relations with vendors must be kept at arms length, and every effort must be made to avoid the appearance of attachment to a specific vendor. Host must coordinate timing of events that vendors wish to present, but vendors must make their own arrangements with the hotels.

EXECUTIVE BOARD MEMBERSHIP

Barbara Everidge, representative of DOD, has resigned because of her job change to a civilian agency (NASA). She has agreed, however, to continue on the editorial staff of THE MILITARY LIBRARIAN and as editor of the Procedures Manual, and as Division Archivist. A new representative for DOD will be appointed by the SLA/MLD Chair. The air force representative's term expires at the end of this workshop, and an appointment for this Service also will be appointed.

EXECUTIVE BOARD COMMENTS

A letter of appreciation will be sent to Nancy Marshall, Director, and the Friends of the Library at the College of William and Mary, for the generous reception that MLW-34.

The February 1990 revised version of the Procedures Manual has been distributed.

HISTORICAL BROCHURE: This project is being coordinated by Barbara Everidge. An historian who would do the work has met with Paul Klinefelter who is optimistic that the project can be realized. All past Hosts of MLW should be contacted for their memoirs. It was hoped to publish this brochure for MLW-35, but the time is now too short. Paul Klinefelter agreed to report back to the Board on the exact plan and timing for this project.

The Chair will keep Gary Walter informed of plans for the mid-winter Board meeting in Monterey.

MLD PROGRAM AT 82ND SLA CONFERENCE

Laurie Stackpole reported that plans are well underway for the events to be held at the conference. The MLD Planning Committee will present the tentative program at the MLD meeting at the end of MLW-34.

ADJOURNMENT

The meeting adjourned at 1815.

Respectfully submitted,

Gretchen Cheung
MLW Acting Secretary

Concur:

Normand L. Varieur
Chair, MLW Executive Board

PROGRAM FOR THE MILITARY LIBRARIANS WORKSHOP



LIBRARIES —

A Vision for the 90's and Beyond...

...THE

34th ANNUAL MILITARY LIBRARIANS WORKSHOP

9-12 October 1990

Wyndham Williamsburg Hotel
415 Richmond Road
Williamsburg, Virginia 23185
(804) 229-4020



Hosted by
 U. S. Army Training and Doctrine Command
 Library and Information Network (TRALINET) Center
 Fort Monroe, Virginia

**34TH
MILITARY LIBRARIANS WORKSHOP**

LIBRARIES--A VISION FOR THE 90'S AND BEYOND

**U.S. ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA
9-12 OCTOBER 1990**

WYNDHAM WILLIAMSBURG HOTEL, WILLIAMSBURG, VIRGINIA

TUESDAY, 9 OCTOBER, 1990

0800-1700	AIR FORCE LIBRARIANS STEERING COMMITTEE	ROOM 320
1300-1900	REGISTRATION	LOBBY
1600-1800	MLW EXECUTIVE BOARD MEETING	WARWICK ROOM
1830-2000	WILLIAM AND MARY RECEPTION	EARL GREGG SWEM LIBRARY, COLLEGE OF WILLIAM AND MARY

WEDNESDAY, 10 October 1990

0700-0900	REGISTRATION (continued)	LOBBY
0900-0905	OPENING CEREMONIES Presentation of Colors	EMPIRE ROOM
0905-0930	WELCOMING REMARKS BG Malcor, HQ U.S. Army Training and Doctrine Command Assistant Deputy Chief of Staff for Training	EMPIRE ROOM
0930-1000	INTRODUCTORY COMMENTS James H. Byrn Normand Varieaur	EMPIRE ROOM
1000-1030	MORNING BREAK (refreshments)	
1030-1130	KEYNOTE ADDRESS <u>LIBRARIES IN THE 90's AND BEYOND</u> Dr. Thomas J. Galvin Director of Doctoral Studies/Professor of Information Science and Policy State University of New York at Albany	EMPIRE ROOM

WEDNESDAY, 10 OCTOBER 1990 (continued)

1130-1300	LUNCH (On your own)	
1300-1415	<u>DEMOGRAPHICS OF WHO OUR CUSTOMERS WILL BE</u> Dr. Philip A. D. Schneider Assistant Director, Workforce Information Office of Personnel Management	EMPIRE ROOM
1415-1515	<u>LIBRARY AND INFORMATION SCIENCE EDUCATION FOR THE FUTURE</u> Dr. Fred W. Roper Dean, School of Library and Information Science University of South Carolina	EMPIRE ROOM
1515-1545	AFTERNOON BREAK	
1545-1700	<u>LEADERSHIP IN THE 90'S</u> Dr. Brooke E. Sheldon Dean, Library School Texas Woman's University	EMPIRE ROOM
1730-1900	RECEPTION	COURTYARD
1900-	COLONIAL DINNER: A SAMPLING OF VIRGINIA HOSPITALITY (Includes entertainment)	WESTMINISTER ROOM

THURSDAY, 11 OCTOBER 1990

0800-0815	ADMINISTRATIVE ANNOUNCEMENTS	EMPIRE ROOM
0815-0930	<u>INTRODUCTION TO FUTURE TECHNOLOGY</u> Dr. Donald E. Riggs Dean, Arizona State Libraries Arizona State University	EMPIRE ROOM
0930-1000	MORNING BREAK (Refreshments)	
1000-1200	ARTIFICIAL INTELLIGENCE/EXPERT SYSTEMS/ HYPERMEDIA: INTRODUCTION AND APPLICATIONS DRS. Larry Bielawski and Robert Lewand Artificial Intelligence Laboratory Goucher College	EMPIRE ROOM
1200-1400	LUNCHEON WITH GUEST SPEAKER Pearce Grove Director, Colonial Williamsburg Foundation Library	WESTMINISTER ROOM

THURSDAY, 11 OCTOBER 1990 (continued)

1400-1500	ARTIFICIAL INTELLIGENCE/EXPERT SYSTEMS/ HYPERMEDIA: DEMONSTRATIONS OF DIFFERENT APPLICATIONS (Presented concurrently)	
	Drs. Bielawski and Lewand Artificial Intelligence Laboratory Goucher College	EMPIRE ROOM
	Susanne M. Humphrey National Library of Medicine	WILLIAMSBURG ROOM
	Randy Bixby Defense Technical Information Center	JAMESTOWN ROOM
1500-1530	AFTERNOON BREAK (Refreshments)	
1530-1630	ARTIFICIAL INTELLIGENCE/EXPERT SYSTEMS/ HYPERMEDIA: DEMONSTRATIONS OF DIFFERENT APPLICATIONS (Repeat of 1400-1500 sessions at same locations)	
TBA	LANTERN TOUR OF COLONIAL WILLIAMSBURG	

FRIDAY, 12 OCTOBER 1990

0800-0815	ADMINISTRATIVE ANNOUNCEMENTS	EMPIRE ROOM
0815-0930	ROLE OF ASSOCIATIONS/NETWORKS/CONSORTIA IN THE NEXT DECADE (ROUNDTABLE) Dr. Steve Baughman/SOLINET Dr. David R. Bender/SLA Katherine Blauer/OCCL James H. Byrn/TRALINET Lois J. Carey/COE Mary B. Levering/FEDLINK	EMPIRE ROOM
0930-1000	MORNING BREAK (Refreshments)	
1000-1110	UPDATES (Introduction by MLW Chair) FLICC, DTIC SERVICES (DOD, ARMY, AIR FORCE, NAVY, CANADA)	EMPIRE ROOM
1110-1140	SLA/MLD BUSINESS MEETING	TBA
1140-1155	CLOSING REMARKS James Byrn/Normand Varieur	EMPIRE ROOM
1155-1200	RETIRE THE COLORS	
1330-	TOURS OF FORT MONROE (Meet in Lobby)	

WORKSHOP SPEAKERS

DAVID R. BENDER

Dr. Bender is the Executive Director of the Special Libraries Association, a position he has held since 1979. In 1977, he received his Ph.D. from Ohio State University. He has served as Chief, School of Library Media Services Branch, Maryland State Department of Education (1972-1979); as a research associate, Ohio State University (1970-1972); and as a consultant for school library services, Ohio Department of Education (1960-1970). He is author of Learning Resources and the Instructional Program in Community Colleges (1980); "Special Libraries: Their Stake in the Future," Educational Media Yearbook (1979-80); "Special Libraries," Bowker Annual of Library and Book Trade Information (1980); and "Networking and School Library Media Programs," School Library Journal (November 1979). At MLW, he will serve on a roundtable that will discuss the role of associations, networks, and consortia in the libraries of the 1990's.

LARRY BIELAWSKI/ROBERT LEWAND

Dr. Bielawski is the Director of Academic Computing as well as the Director of the Decker Center for Information Technology at Baltimore's Goucher College. He is the author of Intelligent Systems Design. His colleague, Dr. Lewand, teaches math and computer science at Goucher College. Together they wrote Expert Systems Development: Building PC Based Applications. These two have also written several expert systems for college and business clients. In 1989 the United Nations Food and Agricultural Organization commissioned them to develop REGIS, a regional information system which allows users to access sophisticated aquaculture information. At MLW, Drs. Bielawski and Lewand will teach a one-half day session on artificial intelligence applications in libraries.

RANDY BIXBY

Randy Bixby is a Technical Information Specialist at the Defense Technical Information Center at Cameron Station. She has written numerous articles pertaining to expert systems including: "DTIC Prototypes: a Query Builder Expert System," DTIC Digest (July 1990); "X Window," Military Librarians Newsletter (Fall 1989); "DOD Gateway Information System Common Command Language: A Retrospective on the Introduction of Prolog as the Development Tool" (with Duc T. Tran and Allan D. Kuhn, May 1989, ADA 211 941); and "Hypertext in a Resource Sharing Greater Machine Level Environment: Hypertext on the VAX," Hypermedia Laboratory Review (December 1988, ADA 209 318). At MLW, she will explain expert system applications at DTIC.

KATHERINE BLAUER

Ms. Blauer, a Regional Marketing Manager for OCLC, is responsible for the marketing of OCLC products and services in the Eastern Region. She works with a staff of marketing representatives and with several regional networks to facilitate delivery of OCLC services to libraries. During the five years she has been with OCLC, she has also served as the product manager for the online acquisitions subsystems and the ACQ350 system. She received her library degree in the UK and has held a variety of positions in public, academic and special libraries in both the U.S. and Britain.

LOIS CAREY

Ms. Carey is presently Chief, Humphreys Engineer Center Support Activity (HECSA) Technical Library, where she is responsible for managing the library and providing informational and technical support services to various Corps of Engineers agencies. She received her MSLS in 1973 from the University of Tennessee. Since then she has served as reference librarian, cataloger, team leader, and instructor of a course designed for library technicians for the Department of the Army.

THOMAS J. GALVIN

Dr. Galvin, our keynote speaker, brings a wealth of experience to this workshop. He received his Ph.D. from Case Western Reserve University in 1973. His career includes serving as Executive Director, American Library Association (1985); Dean and Professor at the University of Pittsburgh, School of Library and Information Science (1974-85); and Associate Director of Simmons College Library (1962-74). He is the author of Library Resource Sharing (1977); Problems in Reference Service (1965); Current Problems in Reference Service (1971); The Case Method in Library Education (1973); The On-Line Revolution in Libraries (1978); The Structure and Governance of Library Networks (1979); Excellence in School Media Programs (1980); Information Technology: Critical Choices for Library Decision-makers (1982); and Priorities for Academic Libraries. He is a recipient of the Alumni Achievement Award, Simmons College School of Library Science, and the Ida and George Eliot Prize Award. Currently Dr. Galvin is Professor of Information Science and Policy and director of doctoral studies at the State University of New York at Albany. At MLW, he will speak on Libraries in the 1990's, during which he will outline the directions in which libraries will be moving as they prepare for the next century. In particular, he will focus his remarks on future technology, educational issues, and future library leaders.

PEARCE GROVE

Mr. Grove has been the Director of the Foundation Libraries, Colonial Williamsburg Foundation, since 1984. He has previously served as Program Officer and National Coordinator, United States Newspaper Program, National Endowment for the Humanities (1981-84); Director of Libraries, Western Illinois University (1975-81). He has written numerous publications on local history as well as library science. A sampling of these include Systems and Standards for the Bibliographic Control of Nonprint Media (1975) and Nonprint Media in Academic Libraries (1975). He was also guest editor of Library Trends (October 1975). At MLW, he will speak on the unique aspects of library service at the Colonial Williamsburg Foundation Library.

SUSANNE M. HUMPHREY

Ms. Humphrey, an information scientist, is director of MedIndEx project at the Lister Hill Center, National Library of Medicine, where she has been developing knowledge-based systems for the past ten years. She has been associated with the National Library of Medicine's Medical Literature Analysis and Retrieval System (MEDLARS) since its inception. Her work includes indexing, searching, database management, user training, and thesaurus development. She is the author of numerous publications pertaining to expert systems in libraries, including: Databases: A Primer for Retrieving Information By Computers (1986); The Indexing Aid Project: Research on Knowledge Based Indexing of the Medical Literature (1987); and The MedIndEx System: Research on Interactive Knowledge-based Indexing of the Medical Literature (1988). At MLW, she will speak on the development of MedIndEx.

MARY B. LEVERING

Ms. Levering is now the Acting Director of the Federal Library Information Center Committee/Federal library Information Network (FLICC/FEDLINK). She has previously served as the Chief, Network Division of the National Library Service for the Blind and Handicapped at the Library of Congress. She was also the assistant coordinator of Review Congressional Research Service with the Library of Congress (1975-78). She is the author of "Services are 500 Percent Better," American Libraries (June 1978); "Equalizing Information Access by Handicapped Persons," ASIS Processes (October 1979); and "Input from Organized and Nonorganized Consumers," Journal of Visual Impairment and Blindness (March 1981). At MLW, Ms. Levering will be a panel member on a roundtable on the future role of associations, networks, and consortia in federal libraries.

RONALD E. RIGGS

Dr. Riggs is currently Dean, Arizona State Libraries. In 1978 he received his doctorate from the University of Colorado. He has served as an academic library director for 18 years, including being the Director of Libraries for the University of Colorado at Denver (1976-1979). He is the author of numerous articles and books including one on expert systems. He was editor of Libraries in the '90s: What the Leaders Expect (1989); Leadership in Librarianship: A Futuristic View (1981); and the Southwest Librarian (1973-1975). He also contributed to Libraries in the Political Process (1980). At MLW, he will discuss future technology in libraries.

FRED W. ROPER

Dr. Roper has been the Dean of the University of South Carolina School of Library and Information Science since 1986. He received his Ph.D. from Indiana University in 1971. His previous positions have included serving as the Assistant Dean and Associate Professor, (1977-1986) School of Library Science, University of North Carolina. At the same institution, he was also an Assistant Professor from 1971-1977. His publications include "Health Sciences Libraries," Resources of South Carolina Libraries (1976); Introduction to Reference Sources in the Health Sciences (1980); and "Publication Patterns of Scientific Serials," American Documentation (April 1968). At MLW, he will speak on the future of library science education and how it will need to change to accommodate advancements in technology and changes in the the workforce.

PHILIP A. D. SCHNEIDER

Dr. Schneider began his federal career in 1962 on active military duty as an ADP plans and operations officer with the U.S. Army Security Agency. Currently he is Assistant Director for Workforce Information in the U.S. Office of Personnel Management (OPM), where he is responsible for the management of government-wide personnel information systems. He is also a founding member of OPM's Privacy Act Data Integrity Board. He received his Ph.D. in the methodology of science and applied statistics from Duke University. He came to OPM in April 1973 after having served five years with the Department of the Army where, as Director of Scientific Services for the Systems Analysis Group, he was responsible for computer systems and software support for operations research analyses. Prior to that he worked as a computer programming group leader for the Defense Communications Agency, where he served as software consultant to Duke University and the University of North Carolina.

Brooke E. Sheldon

Dr. Sheldon has been the Dean of the Library School, Texas Woman's University since 1977. In 1977, she received her Ph.D. from the University of Pittsburgh. She has served as Head of Technical Services and Training, Arkansas State Library (1973-1975); Training Director, Leadership Training Institute, Florida State University (1972-1973). She also served as an Army librarian in Germany, 1956-1957. Dr. Sheldon is the author of a forthcoming book on library leadership. Her other publications include "Personnel Administration in Libraries," LAMA (1980); Regional Library Cooperation in Ohio (1977); Illinois Interlibrary Cooperation Program (1981); and Proposal Writing Handbook (1976). At MLW, she will speak on the dynamics of library leadership in the 1990's.

34th Annual Military Librarians Workshop
List of Attendees

Aldous, Mary
Naval Health Research Center
P.O. Box 85122
San Diego, CA 92186-5211
AUTOVON 553-8425
Commercial 619-553-8425

Alexander, Carolyn I.
Chief Librarian
HQ TRADOC Test and Experimentation
Technical Information Center
Fort Ord, CA 93941-7000
AUTOVON 929-4706
Commercial 408-242-4706

Alexander, Samuel
Library
Royal Military College of Canada
National Defence
Kingston, Ontario, CANADA
K7K 5L0
AUTOVON 270-6229
Commercial 613-541-6229

Ames, Patricia
Naval Air Systems Command
Technical Information and
Reference Center
AIR-5004
Washington, DC 20361-5004
AUTOVON 222-9006
Commercial 202-692-9006

Anderson, Hattie T.
Johns Hopkins University
Applied Physics Laboratory
Johns Hopkins Rd.
Laurel, MD 20707-6099
AUTOVON N/A
Commercial 301-953-5000

Ashe, Dorothy R.
Chief, Library Branch
Community Recreation Division
Woodworth Library, Building 33500
Fort Gordon, GA 30905-5020
AUTOVON 780-3086
Commercial 404-791-3086

Aud, Pat
Patuxent River Central Library
Bldg. 407, Code 62
Patuxent River, MD 20670-5407
AUTOVON 356-1931
Commercial 301-863-1931

Bannister, Jean
Redstone Scientific Info. Center
AMSMI-RD-CS-R
Redstone Arsenal, AL 35898

Barbalas, Lou
Tank-Automotive Command
ASQNC-TAC-DIT
Warren, MI 48397-5000

Barravecchia, Mary
Naval Underwater Systems Center
Technical Library, Code 0262
Newport, RI 02841-5047
AUTOVON 948-4338
Commercial 401-841-4338

Bey, Jacqueline
U. S. Army Defense Ammunition
Center and School
Savanna, IL 61074-9639
AUTOVON 585-8772
Commercial 815-273-8772

Bixby, Randy L.
Defense Technical Info. Center
Cameron Station
Alexandria, VA 22304
AUTOVON 284-7661
Commercial 703-274-7661

Bradley, Murray L.
President, Naval War College
Code E-12
US Naval War College
Newport, RI 02841-5010
AUTOVON 948-2642
Commercial 401-841-2642

Burke, Joseph A.
Command Librarian
HQ, AFSC/DPS
Wright-Patterson AFB, OH
45433-5001
AUTOVON 787-7259
Commercial 513-257-7259

34th Annual Military Librarians Workshop
List of Attendees

Heines, Rodney M.
Chief Librarian
RADC/DOVL
Griffiss AFB, NY 13441-5700
AUTOVON 785-7600
Commercial 315-330-7600

Higgins, James
Center for Naval Analyses
4401 Ford Ave.
Alexandria, VA 22302
AUTOVON N/A
Commercial 703-824-2097

Hopkins, LTC Jim
U.S. Air Force Academy
6650 Brook Park Dr.
Colorado Springs, CO 80918
AUTOVON 259-3871
Commercial 719-472-3871

Hort, Jean L.
Andrews AFB Librarian
1776 ABW/SSL
Andrews AFB, MD 20321-5000
AUTOVON 858-3617
Commercial 301-981-3617

Huang, Dora
Naval Air Development Center
Scientific & Technical Library
Code 813L
Warminster, PA 18974-5000
AUTOVON 441-3380
Commercial 215-441-3380

Hughes, J. Marshal
Naval Surface Warfare Center
Technical Library, Code E23
Dahlgren, VA 22448-5000
AUTOVON 244-8994
Commercial 703-663-8994

Imhof, Peter
Naval Research Laboratory
Code 4800
Washington, DC 20375
AUTOVON 297-2187
Commercial 202-767-2187

Jacobson, Carol E.
Defense Technical Information
Center
Cameron Station
Alexandria, VA 22304-6145
AUTOVON 284-7661
Commercial 703-274-7661

Jensen, L. Barry
Royal Roads Military College
Victoria, BC CANADA
VOS 1B0
AUTOVON N/A
Commercial 604-380-5925

Keeter, Nettie
Library, Code 42
Navy Environmental Health Center
2510 Walner Ave.
Norfolk, VA 23513-2617
AUTOVON 564-7575
Commercial 804-444-7575

Kessler, Katheryn
Librarian
6550 ABG/SSL
Patrick AFB, FL 32925-6625
AUTOVON 854-6881
Commercial 407-494-6881

Killam, Elizabeth
US Army Engineer District,
Norfolk
803 Front St.
Norfolk, VA 23510
AUTOVON N/A
Commercial 804-441-7562

Kinkaid, Yvonne
Chief Librarian
HQ, AFSC/DPSLT
Andrews AFB, DC 20334-5000
AUTOVON 858-2019
Commercial 301-981-2019

34th Annual Military Librarians Workshop
List of Attendees

Busch, Barbara
Navy Personnel Research and
Development Center
Technical Library, Code 231
San Diego, CA 92152-6800
AUTOVON 553-7846
Commercial 619-553-7846

Byrn, James H.
TRADOC Library and Information
Network (TRALINET)
Fort Monroe, VA 23651
AUTOVON 680-4291
Commercial 804-727-4291

Byrn, Sandi
Technical Services
AFSC-LIB
National Defense University
Norfolk, VA 23511-6097
AUTOVON 564-5155
Commercial 804-444-5155

Campion, Serge
Librarian
Fort Frontenac Library
CLFCS
Kingston, Ontario, CANADA
K7K 5L0
AUTOVON 270-5829
Commercial 613-541-5829

Capps, Francis K.
WRDC/AAWA-1/EW TIC
Wright-Patterson AFB, OH
45433-6543
AUTOVON 785-7261
Commercial 513-255-7261

Carey, Lois J.
CEHEC-IM-LM
Kingman Bldg.
Ft. Belvoir, VA 22060
AUTOVON N/A
Commercial 703-355-2388

Charles, Pamela
Center for Naval Analyses
4401 Ford Ave.
Alexandria, VA 23302
AUTOVON 289-2638
Commercial 703-824-2101

Cheung, Gretchen
Library
College Militaire Royal de St.
Jean
Richelain, PQ, CANADA
JOJ 1R0
AUTOVON 621-3011
Commercial 514-358-6011

Cohen, Harriet
Naval Hospital
Medical Library
8750 Mountain Blvd.
Oakland, CA 94627-5000
AUTOVON 828-5607
Commercial 415-633-5607

Cranor, Alice
Defense Intelligence Agency
ATTN: DT-3A
Washington, DC 20340-6173
AUTOVON 243-4688
Commercial 202-373-4688

Cummings, John
Associate Director
Nimitz Library
US Naval Academy
Annapolis, MD 21402
AUTOVON 281-2800
Commercial 301-267-2800

Dakan, Tony E.
USAF Library Program
HQ, AFMFC/DPMSL
Randolph AFB, TX 78150-6001
AUTOVON 487-4589
Commercial 512-652-4589

Deel, Frances
Command Librarian
HQ, AFSC/DPSL
Andrews AFB, DC 20334-5000
AUTOVON 858-2598
Commercial 301-981-2598

Dinger, Char Lou
Commander, Code 3433
Naval Weapons Station
China Lake, CA 93555-6001
AUTOVON 437-4763
Commercial 619-939-4763

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List of Attendees

Eller, Barbara Ann
XVIII Airborne Corps & Fort
Bragg
ATTN: AFZA-PA-R (Library
Branch)
Fort Bragg, NC 28307-5000
AUTOVON 236-6919
Commercial 919-396-6919

Evans, Richard A.
Director, Nimitz Library
U.S. Naval Academy
Annapolis, MD 21402
AUTOVON 281-2194
Commercial 301-267-2194

Finlay, Mary
Dept. of National Defence
Mobile Command Hdqtrs
Main Library
St. Hubert, PQ, CANADA
JBY 5T5
AUTOVON 621-7083
Commercial 514-443-7083

Franco, Tanny
MACTF Warfighting Center
Library, Code WF, 15E,
MCCDCMAGTF
Quantico, VA 22134-5001
AUTOVON 278-3607
Commercial 703-640-3607

Gordon, Diane M.
US Army Armament Research,
Development & Engineering
Center
ATTN: SMCAR-IMI-I, Bldg. 59
Picatinny Arsenal, NJ
07806-5000
AUTOVON 880-3316
Commercial 201-724-3316

Haas, Eva L.
Command Librarian
HQ, USAFE/DPSL
APO, NY 09094-5001
AUTOVON 480-6724
Commercial N/A

Hall, Sue
Space and Naval Warfare Systems
Technical Library
Washington, DC 20363-5100
AUTOVON 332-8771
Commercial 703-602-8771

Hanna, Marcia
DTIC-EB
Cameron Station,
Alexandria, VA 22304-6145
AUTOVON 284-5367
Commercial 202-674-5367

Harned, Marilyn
Manager, Technical Information
Center
Center for Naval Analyses
4401 Ford Ave., POB 16268
Alexandria, VA 22302-0268
AUTOVON 289-2638
Commercial 703-824-2638

Harper, Marie F.
Los Alamos National Laboratory
MS P-362
Los Alamos, NM 87545
AUTOVON N/A
Commercial 505-667-5809

Hart, Sherry
NPIC
7301 Masonville Dr.
Annandale, VA 22003
AUTOVON N/A
Commercial 202-863-3232

Headley, Ava
Army OTEA Library
4501 Ford Ave.
Suite 820
Alexandria, VA 22302-1458
AUTOVON 289-2234
Commercial 202-756-2234

Hedman, Kenneth W.
USMA Librarian
US Military Academy
West Point, NY 10996-1799
AUTOVON 688-2209
Commercial 914-938-2209

34th Annual Military Librarians Workshop
List of Attendees

Klinefelter, Paul
Program Manager for IACs
Defense Technical Information
Center
Cameron Station
Alexandria, VA 22304-6145
AUTOVON 284-6260
Commercial 202-274-6260

Knihnicki, Edwin P.
Aviation Applied Technology
Directorate
US Army Aviation Research and
Technology Activity (AVSCOM)
Building 401
Ft. Eustis, VA 23604
AUTOVON 927-2963
Commercial 804-878-2963

Knudtson, Gail
Command Librarian
HQ, MAC/DPSRL
Scott AFB, IL 62225-5001
AUTOVON 576-3228
Commercial 618-256-3228

Lane, Robert B.
Director
Air University Library
HQ, AU/LD
Maxwell AFB, AL 36112-5564
AUTOVON 875-2606
Commercial 205-293-2606

Levy, Claudia
Supervisory Librarian
CDR, US Army Transportation
Center Community Recreation
Division
Groninger Library, Bldg. 1313
Fort Eustis, VA 23604-5107
AUTOVON N/A
Commercial 804-878-5017

London, Frank M.
Chief Librarian
USA JFK
Special Warfare Center
Marquet Memorial Library
Fort Bragg, NC 28307-5000
AUTOVON 239-9222
Commercial 919-432-9222

Lupp, Denise
Chief Librarian
US Army Medical Research
Institute of Infectious Diseases
Fort Detrick, Bldg. 1425
Frederick, MD 21701-5011
AUTOVON 343-2717
Commercial 301-663-2717

Mangus, Nancy
HQ, SAC/XPAT
Offutt AFB, NE 68113-5001
AUTOVON 271-2851
Commercial 407-294-2851

Marshall, Kathryn E.
Librarian
AWS Technical Library
Scott AFB, IL 62225-5458
AUTOVON 576-2625
Commercial 618-2625

Martin, Margaret J.
Library Director
AFSC-LIB
National Defense University
Norfolk, VA 23511-6097
AUTOVON 564-5155
Commercial 804-444-5155

May, Carolyn F.
WRDC/AAWA-1/EW TIC
Wright-Patterson AFB, OH
45433-6543
AUTOVON 785-7261
Commercial 513-255-7261

McCauley, Ellen
Defense Technical Information
Center
Cameron Station
Alexandria, Virginia 22304-6145
AUTOVON 284-6980
Commercial 703-274-6980

McClaghry, Helen
Chief Librarian
Base Library
Lowry AFB, CO 80230-5000
AUTOVON 926-3093
Commercial 303-676-3093

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List of Attendees

McIntyre, Susan
Defence Research Establishment,
Ottawa
Department of National Defence
Ottawa, Ontario, CANADA
K1A 0Z4
AUTOVON 848-2657
Commercial 613-998-2657

McLaughlin, Barbara L.
Harry Diamond Laboratories
ATTN: SLCHD-TL
Adelphi, MD 20783
AUTOVON 290-2536
Commercial 202-394-2536

McLaughlin, Lee R.
Director
USAF Geophysics Lab Res Library
AFGL/SULL
Hanscom AFB, MA 01731-5000
AUTOVON 478-4895
Commercial 617-377-4895

Meechan, Martine G.
National Defence Library
Services
2 North Tower
Department of National Defence
MGen George R. Pearkes Bldg.
Ottawa, Ontario, CANADA
K1A 0K2
AUTOVON 846-0930
Commercial 613-996-0842

Miles, Elizabeth T.
Naval Ordnance Station
Technical Library, Code 701D
Louisville, KY 40214
AUTOVON 989-5662
Commercial 502-364-5662

Miller, Kay
Naval Oceanographic Office
Maury Oceanographic Library
Stennis Space Center, MS
39522-5001
AUTOVON 485-4017
Commercial 601-688-4017

Monroe, Evelyn
Fleet Combat Direction Systems
Support Activity, Dam Neck
Technical Library, Code 01E
Virginia Beach, VA 23461-5300
AUTOVON 433-7648
Commercial 804-433-7648

Moorhouse, Rose
Library Director
22 CSG/SSL
March AFB, CA 92518-5000
AUTOVON 947-2203
Commercial N/A

Murdoch, Sandra K.
US Air Force
24CSG/SSL
Base Library, FL 4810
APO Miami 34001-5000
AUTOVON 284-3006
Commercial N/A

Nekoba, Barbara
Marine Corps Intelligence Center
2217 William and Mary Dr.
Alexandria, VA 22308
AUTOVON 278-2268
Commercial 703-640-2268

Nicula, Gail
US Armed Forces Staff College
ATTN: Library
7800 Hampton Blvd., Rm. 13202
Norfolk, VA 23511-6097
AUTOVON 564-5321
Commercial 804-444-5321

Oswitt, Jane E.
Mare Island Naval Shipyard
Science & Technology Library
Code 202.13, Stop T-4
Bldg 483, 4th fl.
Vallejo, CA 94592-5100
AUTOVON 253-2532
Commercial 707-646-2532

34th Annual Military Librarians Workshop
List of Attendees

Pollok, Karen E.
Station Library
Building 416
NAS OCEANIA
Virginia Beach, Virginia
23460-5128
AUTOVON 433-2400
Commercial 804-433-2400

Renick, Timothy D.
U.S. Army TRADOC
ATTN: ATBO
Fort Monroe, VA 23651
AUTOVON 680-4291
Commercial 804-727-4291

Rettenmaier, W.F.
Office, Chief of Naval Research
Code 01232
800 N. Quincy St.
Arlington, VA 22217-5000
AUTOVON 226-4415
Commercial 703-696-4415

Rhodes, Myrtle
Naval Coastal Systems Center
Code 06112
Panama City, FL 32407-5000
AUTOVON 436-4321
Commercial 904-234-4321

Rinas, Mary
Chief Librarian
2750 ABW/SSL
Wright-Patterson AFB, OH
45433-5000
AUTOVON 787-4340
Commercial 513-257-4340

Roling, Rebecca M.
Dir., USA Ballistic Research
Lab.
ATTN: SLCBR-DD-T
Aberdeen Proving Ground, MD
21005-5066
AUTOVON 298-3229
Commercial 301-278-3229

Rothschild, M. Cecilia
Librarian
Base Library
Carswell AFB, TX 76127-5000
AUTOVON 739-7677
Commercial 817-782-7677

Roy, Alice
Command Librarian
HQ, TAC/DPSRL
Langley AFB, VA 23665-5000
AUTOVON 574-2821
Commercial N/A

Rusnak, Elaine
General Dynamics Services Co.
PO Box 760
Troy, MI 48099-0760
AUTOVON N/A
Commercial 313-244-7233

Ryder, Suzanne
Naval Air Station
Central Library, Bldg. 407
Code 62
Patuxent River, MD 20670-5407
AUTOVON 356-1930
Commercial 301-863-1930

Sammet, Diane
IIT Research Institute
185 Admiral Cochrane Dr.
Annapolis, MD 21401
AUTOVON 281-2251
Commercial 301-626-7077

Satsky, Maynard
Librarian
Base Library
Dover AFB, DE 19902-5225
AUTOVON 445-3992
Commercial 302-677-3992

Sauer, Mary Lou
Command Librarian
HQ, SAC/DPSOL
Offutt AFB, NE 68113-5001
AUTOVON 271-2223
Commercial 402-294-2223

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List of Attendees

Schaeffer, Reiner H.
Director
HQ, USAFA/DFSEL
USAF Academy, CO 80840-5701
AUTOVON 259-2590
Commercial 719-472-2590

Scheitle, Janet
TRADOC Library and Information
Network
Fort Monroe, VA 23651
AUTOVON 680-4291
Commercial 804-727-4291

Schnare, Bob
Department of the Navy
Naval War College
Newport, RI 02841-5010
AUTOVON 948-2641
Commercial 415-841-2641

Schollenberger, Kathleen
Naval Ship Systems Engineering
Station
Technical Library, Code 012F
Philadelphia, PA 19112-5083
AUTOVON 443-7078
Commercial 215-897-7078

Schryer, Mike
Directorate of Scientific
Information Services
National Defence Headquarters
McKen George R. Pearkes Bldg.
Ottawa, Ontario, CANADA
K1A 0K2
AUTOVON N/A
Commercial 613-992-2033

Setzer, Sharon L.
Defense Technical Information
Center
19 Carriage House Circle
Alexandria, VA 22304
AUTOVON 284-6847
Commercial 703-274-6847

Shamanski, Carol
ProSoft
190 Reflections
Virginia Beach, VA 23452
AUTOVON 564-9266
Commercial 804-444-9266

Shelton, Margaret
Information Handling Services
4116 Granby Rd.
Woodbridge, VA 22193
AUTOVON N/A
Commercial 703-690-6413

Sites, Katherine P.
Chief, Library/Learning Center
Army Logistics Library
Building P-12500
Fort Lee, VA 23801-6047
AUTOVON 687-1797
Commercial 804-734-6047

Smith, Donna C.
Cdr. CRDEC
ATTN: SMCCR-MSI
Aberdeen Proving Ground, MD
21010-5423
AUTOVON 584-2884
Commercial 301-671-2884

Snellenberg, Betty
Navy & Marine Corps Intelligence
Training Center
Library, Bldg. 420, Dam Neck
Virginia Beach, VA 23461
AUTOVON 433-8061
Commercial 804-433-8061

Sorokatch, Lacy
Navy Weapons Station
Technical Library, Code 016
Yorktown, VA 23691-5000
AUTOVON 953-4726
Commercial 804-887-4726

Spinks, Paul
Naval Postgraduate School
Dudley Knox Library
Monterey, CA 93943-5002
AUTOVON 878-2341-
Commercial 408-646-2341

34th Annual Military Librarians Workshop
List of Attendees

Stackpole, Laurie
Naval Research Laboratory
Ruth H. Hooker Memorial Library
Code 4820
4555 Overlook Ave., SW
Washington, DC 20375-5000
AUTOVON 297-2357
Commercial 202-767-2357

Sweeney, Joan L.
Institute for Defense Analyses
1906 Franwall Ave.
Silver Spring, MD 20902
AUTOVON N/A
Commercial 703-845-2044

TALBERT, Rex
DTIC
Cameron Station
Alexandria, VA 22304

Taliaferro, Helen
Air University Library/LDE
Maxwell AFB, Alabama 36112-5564
AUTOVON 875-2237
Commercial 205-293-2237

Todd, Fred
Chief Librarian
USAFSAM/TSK
Brooks AFB, TX 78235-3501
AUTOVON 240-3725
Commercial 512-536-3725

Tozier, Claire
Defense Technical Information
Center
Cameron Station
Alexandria, VA 22304-6145
AUTOVON 284-6804
Commercial 703-284-6804

Trafford, Mabel
Medical Librarian
Tripler Army Medical Center
Honolulu, Hawaii 96859-5000
AUTOVON 315-6391
Commercial 808-433-6391

Vajda, John
Navy Department Library
Washington Navy Yard, Bldg. 44
Washington, DC 20374-0571
AUTOVON 288-4132
Commercial 202-433-4132

Varieur, Normand L.
U.S. Army Armament RD&E Center
SMCAR-IMI-I, Bldg. 59
Picatinny Arsenal, NJ
07806-5000
AUTOVON 880-2914
Commercial 201-724-2914

Wallace, Katharine
Naval Surface Warfare Center
Library, Code E-232
10901 New Hampshire Ave.
Silver Spring, MD 20903-5000
AUTOVON 290-1922
Commercial 301-394-1922

Walter, Gary D.
Aiso Library
Defense Language Institute
Presidio of Monterey, CA 93944
AUTOVON 878-5572
Commercial 408-647-5572

Watlington, Joyce C.
USA Laboratory Command
Human Engineering Laboratory
ATTN: SLICHE-SS-IR-L
Aberdeen Proving Ground, MD
21005-5001
AUTOVON 298-5899
Commercial 301-278-5899

Weston, Janice
USA Ordnance Center & School
Library
Simpson Hall-Bldg. 3071
Aberdeen Proving Ground, MD
21005-5201
AUTOVON 298-5615
Commercial 301-278-5615

34th Annual Military Librarians Workshop
List of Attendees

Whalen, Tammy
Operational Research Analysis
Establishment
National Defence Headquarters
MGen George R. Pearkes Bldg.
Ottawa, Ontario, CANADA
K1A 0K2
AUTOVON 845-0418
Commercial 613-995-0418

Whitehill, Margaret
Langley AFB Library
313 Rudisill Rd.
Langley AFB, VA 23669
AUTOVON 574-2906
Commercial 804-764-2906

Wiley, Connie
Librarian
GL/SULL
Hanscom AFB, MA 01731-5000
AUTOVON 478-4619
Commercial 617-377-4619

Williams, Mary E.
Office of the General Counsel
Law Library
Department of the Navy
CP-5, Rm. 450
Washington, DC 20360-5110
AUTOVON 222-7378
Commercial 202-692-7378

Williams, Mary Lou
Naval Oceanographic and
Atmospheric Research Laboratory
Code 125L
Stennis Space Center, MS
39529-5004
AUTOVON 485-4868
Commercial 601-688-4868

Wilson, William
Technical Librarian
3380 ABG/SSL
Keesler AFB, MS 39534-5000
AUTOVON 597-2604
Commercial 601-377-2604

Woinowsk, Orrine
Librarian
AFHRL/TSRL
Brooks AFB, TX 78235-3601
AUTOVON 240-2651
Commercial 512-536-2651

Wright, Kathleen J.
Naval Oceans Systems Center
Technical Library, Code 9642B
San Diego, CA 92152-5000
AUTOVON 553-4900
Commercial 619-553-4900

THE MILITARY LIBRARIANS WORKSHOPS

MLW	YEAR	DATES	HOSTS	THEME
1st	1957	21-23 Oct	Air University Library Maxwell AFB, AL	Air University Library
2nd	1958	2-4 Oct	Army Artillery and Missile Center Fort Sill, OK	General Problems of Military Libraries
3rd	1959	8-10 Oct	Naval Postgraduate School Monterey, CA	Operation of Military Technical Libraries
4th	1960	7-9 Oct	Armed Services Technical Information Agency Washington, DC	Controlling Literature by Automation
5th	1961	4-6 Oct	U.S. Air Force Academy Colorado Springs, CO	Management Problems
6th	1962	26-28 Sep	White Sands Missile Range White Sands, NM	Personnel Practices and Procedures as They Affect Military Library Management
7th	1963	2-4 Oct	Naval Ordnance Laboratory	Procurement and Procedures Retrieval
8th	1964	14-16 Oct	Air Force Weapons Laboratory Albuquerque, NM	The Military Library in the Information Process: A Report to Management
9th	1965	3-5 Nov	U.S. Military Academy West Point, NY	The Library in the Defense Establishment: Mutual Obligations Toward Mission Accomplishment
10th	1966	12-14 Oct	Naval Electronics Laboratory San Diego, CA	Library Employee Development
11th	1967	31 Oct- 2 Nov	Air Force Institute of Technology Wright-Patterson AFB, OH	The User and the Library

12th	1968	30 Sep- 2 Oct	U.S. Army War College Carlisle Barracks, PA	Managing a Military Library
13th	1969	29 Sep- 1 Oct	U.S. Navy War College Newport, RI	Administration of Libraries
14th	1970	30 Nov- 2 Dec	Industrial College of the Armed Forces Washington, DC	DoD Libraries in Transition
15th	1971	4-6 Oct	HQ. U.S. Air Force San Antonio, TX	Principles of Management for DoD Libraries
16th	1972	2-4 Oct	Redstone Scientific Information Center Redstone Arsenal, AL	Technology Transfer
17th	1973	9-12 Sep	Naval Research Laboratory Washington, DC	Military Libraries and the Challenge of the 70's
18th	1974	10-12 Sep	HQ, U.S. Army Communications Command Fort Huachuca, AZ	Interpersonal Communications
19th	1975	30 Sep- 2 Oct.	U.S. Air Force Academy Colorado Springs, CO	Intellectual Updating Changes in the State of the Art of Librarians
20th	1976	20-22 Oct	U.S. Naval Academy Annapolis, MD	Public Relations
21st	1977	27-29 Sep	U.S. Army War College/Army Military History Institute Carlisle Barracks, PA	Resource Sharing
22nd	1978	31 Oct- 2 Nov	Air Force Weapons Laboratory Albuquerque, NM	Resource Sharing II
23rd	1979	3-5 Oct	Defense Documentation Center Alexandria, VA	Military Special Libraries in 1990
24th	1980	15-17 Oct	Naval Postgraduate School Monterey, CA	Information Management in DoD The Role of Librarians

25th	1981	14-16 Oct	Air University Maxwell AFB, AL	Leadership and Management for the Military Librarian
26th	1982	13-15 Oct	U.S. Military Academy West Point, NY	Interservice Resource Management
27th	1983	12-14 Oct	Defense Nuclear Agency Washington, DC	Space Planning and Today's Technologies
28th	1984	17-19 Oct	Naval Coastal Systems Center Panama City, FL	Costs and Benefits of Library Operations 1984 and Beyond
29th	1985	9-11 Oct	U.S. Air Force Academy Colorado Springs, CO	The Military Librarian as a Manager: We Win With People
30th	1986	15-17 Oct	U.S. Army Corps of Engineers New Orleans, LA	Networking Integrated and Local Library Systems
31st	1987	20-23 Oct	Defense Intelligence Agency Washington, DC	Information Management and Intelligence
32nd	1988	12-14 Oct	Naval Ocean Systems Center San Diego, CA	DoD Librarian Interfaces
33rd	1989	18-20 Oct	Air Force School of Aerospace Medicine San Antonio, TX	Libraries & Technology in Transition: Meeting the Challenge
34th	1990	9-12 Oct	U.S. Army Training & Doctrine Command Williamsburg, VA	Libraries: A Vision for the 90's and Beyond

FORTHCOMING HOSTS

35TH	1991	Defense Language Institute Monterey, CA
36th	1992	Naval Underwater Systems Center New London, CT
37th	1993	Air Force Weapons Laboratory/Rio Grande Chapter of SLA Albuquerque, NM
38th	1994	Army Armament Research, Development and Engineering Center Parsipanny, NJ
39th	1995	Defense Technical Information Center Alexandria, VA

ACKNOWLEDGMENTS

SPONSOR: Special Libraries Association, Military Libraries Division

HOST: U.S. Army Training and Doctrine Command
Library and Information Network (TRALINET) Center
Fort Monroe, Virginia

R. L. Dilworth
Brigadier General, U.S. Army
Deputy Chief of Staff for
Base Operations Support

James H. Byrn
Director, TRALINET

PROGRAM COMMITTEE:

James H. Byrn
Janet Scheitle
Tim Renick

REGISTRATION COMMITTEE:

Janet Scheitle
Tim Renick
David Cundiff

LOCAL ARRANGEMENTS:

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Janet Scheitle
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David Cundiff
Edwin Burgess
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Raymond Abell
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Jennifer Doran
Kathryn Marshall
Paul Klinefelter

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